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Be a Better Reader

BOOK

I

CANADIAN EDITION

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SKILL DEVELOPMENT IN READING

Literature

History and Geography

Science

Mathematics

CURRICULUM

PRENTICE-HALL OF CANADA, LTD.

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TO THE TEACHER

Hundreds of thousands of students have used the First Edition of the BE A BETTER READER series with success. Some of the improvements in the Second Edition result from this wide classroom usage of the books with all type of students in all types of classrooms. The bulk of the changes, however, have to do with revisions in text due to the rapidly changing world. Changes in world conditions particularly affect the content in social studies and science. All selections having to do with these subjects have been thoroughly up-dated.

This book is designed (1) to improve the basic common skills needed in reading all types of material and (2) to develop special skills needed for effective reading in science, social studies, mathematics, and literature.

The unit topics were selected because of their appeal to teenagers and because of their frequency of occurrence in junior high and high school textbooks. The skills are those most often needed in studying text and reference books at these levels. The special vocabularies include words common to the most widely used texts in science, social studies, and mathematics. Because of these features this book should fit into and reinforce the average school curriculum. It can be used effectively for either developmental or remedial instruction.

The *Teacher's Guide* which accompanies this book contains explanations of skills, page-by-page procedures, additional activities, and answers to all questions in the text.

In preparing BE A BETTER READER, BOOK I, Second Edition, additional aids to vocabulary development and syllabication have been provided. The mathematics selections have been revised to provide for developmental as well as remedial instruction. Factual matter has been thoroughly updated. Each question in the activities, each answer, and each answer-space has been restudied to ensure clearness, accuracy, and adequate provision for student answers. The Canadian edition has retained the developmental sequence of reading skills, the format and types of questions, but has substituted material more closely related to the curriculum of Canadian schools.

Merriam-Webster system of pronunciation is used by permission of the publishers of *Webster's New International Dictionary*, Second Edition, copyright 1957 by G. & C. Merriam Co., publishers of the Merriam-Webster Dictionaries.

Particular effort has been made to produce a text and *Teacher's Guide* so self-contained that they can be effectively used by a teacher without special training in subject areas apart from the teacher's own. Selections in science, history, and social studies are complete in themselves, insofar as special subject-information is concerned. Those mathematical processes which the teacher may have forgotten are explained in the *Teacher's Guide*. A whole new section on general procedures, complete with a stenographic report of a reading lesson, has been provided.

A full syllabus of reading skills, with page references, will be found in Chapter II of the introductory material in the *Teacher's Guide*. The following summary only suggests the variety of skills developed in BE A BETTER READER, BOOK I.

Development of Common Skills. Skills used in several types of reading or in two or more subject areas are given special introductory treatment on skill development pages. Common skills developed include critical reading to judge an author's statements, finding the main idea in paragraphs, grasping details, making comparisons, outlining, summarizing, and sensing causes and effects.

Use of phonics in pronouncing new words is developed through review of identification, sounds, and applications of consonants and consonant blends, speech sounds, and vowels.

Use of structural analysis in pronouncing and understanding new words is developed with practice in identifying and grasping meanings of compound words, root words, prefixes, and suffixes. Syllabication is carefully reviewed.

Context clues are used as an aid in recognizing new words. Application of phonics is checked with meaning clues.

Student ability to locate information is increased with practice in skills for using the dictionary, encyclopedia, index, card catalog, and table of contents.

Rapid reading is developed with instructions on how to read fast. Practice in timed reading is given with narratives, science material, and social studies material when the content is of such a nature that rapid reading is appropriate.

Skill Development in Special Subjects. In *science*, students are given practice in using several special skills including particularly identifying and using those skills needed in reading different patterns of science writing: classification of science facts; explanation of a process; detailed factual material; problem-solving text.

In *social studies*, students are taught to read maps, read critically, associate dates with events, sense causes and effects, find main ideas and grasp details, recall details, take notes, outline, and read graphs.

In *mathematics*, students are given practice in reading to grasp a problem as a whole, decide what to find, determine what facts are given, choose the correct process, and make an estimate. Other mathematical reading includes reading graphs and diagrams and following exact instruction.

In *literature*, students are helped to read for appreciation through work with character, style, emotion, interpretation, turning points, and so on.

TO THE STUDENT

Do you read in the same way when you study *science*, *social studies*, *mathematics*, and *literature*? You shouldn't. You need to use different skills when reading different materials for different purposes.

In your **science** books you find chapters or parts of chapters that tell about problems in science and how scientists have solved them. Other sections tell about classifications of living things or objects. Others describe processes. Some give you detailed facts about a topic. Then there are directions or experiments, which must be carried out exactly. You should study each of these different types of science material in a different way. This book tells you how to work with each type.

In studying **social studies** material, you need to have highly developed skills in reading maps, graphs, and pictures. Each of these kinds of material calls for a different set of skills. You need to know how to associate dates with events and remember them in order, how to look for causes and effects, how to grasp and recall detailed facts, and how to do critical reading.

Mathematics should be read very differently from literature, social studies, and most science material. Very often students have trouble with mathematics because they don't know how to *read* mathematics. In this book you will be given a great deal of help in reading problems, as well as in reading and making graphs, interpreting diagrams, and following directions such as you find in your mathematics book.

Literature is altogether different from the three subjects previously discussed, and you should use entirely different skills when reading stories and poems. Lit-

erature should be read for enjoyment, understanding, and appreciation. In order to get the most out of literature you need to put yourself in the place of the characters and live through their experiences with them. You will enjoy doing such things as discussing the feelings and actions of the characters, reading "between the lines" to get deeper meanings, and trying to see the "word pictures" vividly.

Rapid reading is a knack which you can easily develop. This book will teach you how to read fast and how to adjust your speed to different purposes.

The **pronunciation of new words** that you will meet in your reading calls for the use of many skills. You may need to review these skills and make better use of them than you have in the past. This book will help you with several of the pronunciation skills.

Locating information in different sources will be necessary in your reference reading. You will be given help to enable you to find what you want more easily.

Vocabulary growth is an important goal for all students. The special vocabularies in science, social studies, and mathematics often cause trouble in reading. In these pages you will work with words which you will most commonly meet in these subjects.

Now you have some understanding of why you are given the different kinds of help provided in this book. Do thoroughly and well everything that you are asked to do. Then apply to the study of your regular subjects the procedures that you have learned. Your efforts will be richly rewarded in more productive study periods, better lessons, and higher grades.



UNIT ONE

SPACE TRAVEL



Read the make-believe story below just for enjoyment. To get the most pleasure out of it put yourself in Jimmy's place. Think how lonely you would have been on such a trip, what reasons you might have had for worrying, and how you might have felt at the end of the journey. You will enjoy the story more if you know the words below.

The name of the spaceship in this story is *Nebula* (něb'ù lá).

A metal which has the power to attract iron and nickel is *magnetic* (măg nět'ik).

The force that holds bodies to the earth is called *gravity* (grăv'ī tī).

One of the gases in the air necessary for human life is *oxygen* (ök'sī jěn).

AN IMAGINARY TRIP TO THE MOON*

"I wonder what's going to happen to me when they find me," thought Jimmy Neal. "Dad surely will be worried about me."

These had been Jimmy's thoughts since the rocket ship *Nebula* had left the space station on earth. How long and lonely the hours had been as the ship sailed on and on into space!

Jimmy was locked inside the *X-21*. This *X-21* was a separate part of the rocket. It was fastened to the larger spaceship, the *Nebula*.

Jimmy's father worked at the space station. He had been helping Captain George get everything ready for a trip to the moon. Just before the ship took off he had sent Jimmy on board with a message for Captain George who was in charge of a dangerous mission to put some secret instruments on the moon.

Jimmy looked all around inside the spaceship. No one was there. He went on into the *X-21*. The door slammed shut behind him. He pounded on it, but nobody could hear him through the thick wall.

Later Jimmy felt the *Nebula* take off. Now it was too late for him to get out of the *X-21*. "This is terrible!" he groaned aloud. "Dad may even lose his job at the space station because of me." He thought of his Mom, so many, many miles away on the earth. She would worry, too.

There was some air inside the *X-21*, and Jimmy had found and put on a space suit. There was oxygen in the suit so Jimmy had no trouble breathing.

As time passed by, Jimmy became hungry. Looking around, he found a large box filled with food tablets. He was glad that there was plenty of food on board.

As Jimmy ate the tablets he looked out the window at the black sky and the blaze of stardust. Here and there he could see lights of comets and far-away planets.

Tiring of the view, Jimmy got up and began looking at all of the knobs and handles and wheels in the cabin. He walked about in his magnetic boots, which held him fast to the floor. Without them he would be floating, light as a snowflake, because of the weak pull of the earth's gravity.

Seemingly endless hours and days passed. But finally something happened. Jimmy heard someone opening the door. He was free at last!

"Maybe I should see what is going to happen before I show myself," he thought. So he hid behind a large chest.

The man who came in was Captain George, and he was in a space suit. He sat down in the pilot's seat and turned dials and switches in front of him. Then he spoke over the radio. Jimmy could hear the words through his own space-helmet radio.

* Adapted from a story prepared for this book by Richard M. Elam.

“Attention, gentlemen,” the Captain said. “I shall now land on the moon in the X-21. After completing the object of the mission, I shall return to the *Nebula* at 1317 hours.”

Jimmy almost cried out in his surprise. So the X-21 was the only part of the ship that was going to land on the moon! The *Nebula* itself was going to stay up in space.

He had no more time to think. Already the X-21 had cut itself off from the mother ship and was beginning to drop moonward.

Minutes later Jimmy felt a thump beneath him and then the X-21 became still. The little rocket had landed nose upward so that the wall behind him was now the floor. Without warning, the floor fell away and Jimmy found himself tumbling down an opening with a ladder hanging from it.

He came to rest in a pile of dust. Unhurt, he got up and looked around. Never had he seen such a lonesome-looking place. There were high hills and great, bare plains as far as he could see. And the sky was as black as midnight.

Jimmy was excited. He was really on the moon! Over his helmet radio he heard someone laughing. It was Captain George, who was now standing outside the spaceship.

“I thought I was alone on this mission,” said the Captain. “But I see that I have had some company all along. When I was your age, I guess I would have stowed away, too.”

“B—but I didn’t mean to . . .” Jimmy started to explain. “You see, my father sent me on board with a message and I got locked in the X-21.”

“Tell me about it later, son,” the space-officer said, kindly. “Here. Put this box of instruments between the two rocks over there.”

Jimmy took the small black box. He grinned happily at Captain George. He put the box out of sight between the rocks that the Captain had chosen.

“Just think, I am the very first American boy ever to land on the moon!” Jimmy thought. “My name will be in all the history books!”

Jimmy Neal was very proud. By the smile on the Captain’s face, he knew everything would be all right.

COMPREHENSION QUESTIONS

Your answers to these questions will show how well you remember facts that were stated in the story.

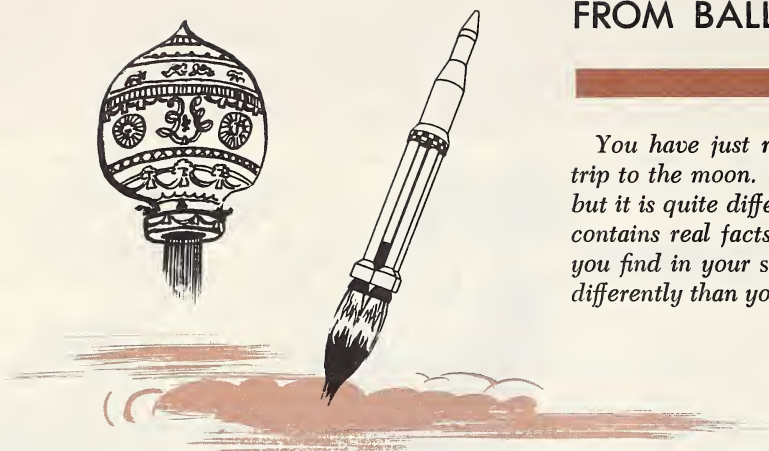
1. What was the X-21? _____
2. Where was the oxygen that helped keep Jimmy from suffocating? _____
3. What did Jimmy have to eat? _____
4. What could Jimmy see when he looked out the window? _____
5. What kept Jimmy from floating about when he walked? _____
6. Why would Jimmy have floated without this help? _____
7. Which was the only craft to land on the moon, the *Nebula* or the X-21? _____
8. Who hid the instruments on the moon? _____
9. Where did he hide the instruments? _____
10. How did Jimmy know that everything was going to be all right? _____

DISCUSSION QUESTIONS

Your answers to these questions will show how well you figured out meanings not stated directly in the story; and how well you succeeded in putting yourself in the place of Jimmy and of Captain George.

1. Why did Jimmy think that his father might lose his job? _____
2. To whom was Captain George talking over the radio? _____
3. Would you like to have the same adventure that Jimmy had? _____ Why? _____
4. How do you think Jimmy felt when he found himself falling through the opening in the floor? _____
5. How do you think the Captain felt when he found a boy had come with him? _____
6. What kind of a person do you think Jimmy was? Underline three words or phrases:
brave disagreeable a crybaby cowardly unkind
thoughtful of his parents usually helpful to his father
7. What kind of a person do you think the Captain was? Underline three words or phrases:
kind greedy brave good-natured cross selfish

FROM BALLOONS TO ROCKETS



You have just read a fanciful story about Jimmy Neal's trip to the moon. This next article is about air travel, also, but it is quite different from the fanciful story. This article contains real facts from history. It is like the information you find in your social studies book. You should read this differently than you read the story about Jimmy Neal.

Reading Headings

1. First of all, notice that there are several headings in heavy black type. This kind of type is called **boldface type**. When you see a heading in boldface you should know that it is important.
2. Read the boldface headings throughout the article. Don't stop to read anything under the headings at this time. As you read each heading think how that heading leads up to the next one.
3. After you have read the headings do Activity 1 on page 5.

Reading the Article

After working with the headings you will have a good preview of important events from the time of the first balloon to the present time. You will then be ready to read the entire article, as follows:

1. Read each heading in boldface type again, and think of questions you would like to have answered about each one. For example, you might like to have these questions answered about the first heading: How did man happen to invent the balloon? Who invented the first balloon? What was the first balloon like?
2. Read to answer the questions that you would like to have answered under each heading.
3. After you have finished reading the article, do Activity 2 on the next page.

You will read the article better if you know all of the words below.

A man whom you will read about is *Jacques Montgolfier* (zhâk' mönt göl'fi ěr).

Another man named in the article is *de Rosier* (de rô'zhĕr).

And still another man whom you will read about in the article is *Professor Goddard* (prô fĕs'ĕr göd'ĕrd).

A gas once used in balloons was *hydrogen* (hĭ'drô jĕn).

Men have made better airplanes through the years. They have made *progress* (prôg'rĕs).

An airplane has parts that turn round and round like huge fans. These are *propellers* (prô pĕl'ĕrz). Some rockets burn *liquid fuel* (lik'wid fŭ'ĕl).

THE STORY OF AIRCRAFT

The Invention of Balloons. The first balloons were invented by two brothers, Joseph Montgolfier and Jacques Montgolfier. These brothers were sons of a paper dealer who lived in France. They often watched smoke floating up into the air while burning piles of wastepaper.

"If we could enclose smoke in light bags, the bags would rise up into the air, too," the brothers reasoned.

So on June 5, 1783, they placed a huge linen bag over a pile of straw and set fire to the straw. When the bag was filled with hot air and smoke, they cut the ropes that held it down.

The balloon sailed up into the sky and remained there for about ten minutes. During that time it travelled a distance of 1½ miles. This was the first hot air balloon.

The First Man Goes Up in a Balloon. Later that same autumn, a man by the name of de Rosier made a balloon flight that is very famous for two reasons. He fastened a pan of coals to the balloon and proved that hot air could be fed to the balloon as it traveled. What was even more important was that de Rosier, himself, went up in the balloon. He was the first human being ever to fly in a balloon.

Balloons Begin to Use Hydrogen. Ten days after de Rosier's flight, a man by the name of Charles made the first flight in a hydrogen-filled balloon. Hot air is a gas lighter than cold air, so balloons filled with hot air will stay up as long as the air is hot. Hydrogen is a gas 14 times lighter than air. So Charles filled a silk balloon with hydrogen. The flight was successful, and the hydrogen-filled balloon stayed in the air about two hours.

Man Learns How to Steer Balloons. The next step in the progress of aircraft was the invention of a way to steer balloons. The round balloons you have been reading about just drifted along wherever the wind carried them.

In their first attempt to steer a balloon, men took along oars and tried to row the big gas bags as you would row a boat. This, of course, didn't work.

Finally an engine and propellers were placed in a balloon. Once this was done, man found that he could drive a balloon wherever he wanted it to go.

Airplanes Replace Balloons. It was more than 100 years after the Montgolfiers invented their balloon before the first successful flight with an airplane. On December 19, 1903, the Wright brothers took up an airplane at Kitty Hawk, North Carolina.

Since that time, airplanes have proved to be much better for travel than balloons. They have now replaced balloons for travel purposes.

Space Rockets Are Here. Men are no longer satisfied just to cross land and sea. They now want to travel to the moon and the planets.

The liquid fuel rocket was invented by Professor Goddard in 1926. Great progress has followed. Rockets have put man-made moons into orbit. Other rockets have soared millions of miles into space. Someday Jimmy's trip may be real, not imaginary.

ACTIVITY 1

Here are the headings you just read, out of order. Number them in the order in which the events really happened, as men struggled with the problem of air travel. Heading one is numbered for you.

_____ The First Man Goes Up in a Balloon.

_____ Space Rockets Are Here.

_____ Man Learns How to Steer Balloons.

1 _____ The Invention of Balloons.

_____ Airplanes Replace Balloons.

_____ Balloons Begin to Use Hydrogen.

ACTIVITY 2

Underline the word or phrase under each sentence that should go in the blank space in the sentence.

1. The first balloon was invented by _____.
a. Charles b. Goddard c. the Montgolfiers

2. The first balloon was sent up in _____.
a. 1903 b. 1783 c. 1926

3. The first man to go up in a balloon was _____.
a. Charles b. Montgolfier c. de Rosier

4. The gas first used for lifting balloons was _____.
a. hot air b. oxygen c. hydrogen

5. The first successful airplane flight was made by _____.
a. Charles b. the Wright brothers c. Goddard

6. The aircraft used most widely for travel at present is the _____.
a. balloon b. rocket c. airplane

7. The first liquid fuel rocket was invented in _____.
a. 1726 b. 1826 c. 1926

8. The liquid fuel rocket was invented by _____.
a. de Rosier b. Charles c. Goddard

Studying in Your Social Studies Books

The next time you read a chapter in a *social studies* book, or in a *history* or *geography* book, work with it in the same way that you worked with this article.

1. Read all of the headings in boldface type. Think how each one leads into the next one.
2. Turn back to the beginning and read the entire chapter carefully. Each time you come to a boldface heading, find out what information is given about that topic.

DANGERS OF SPACE TRAVEL



In the story that you have read, you were told that Captain George was in charge of a “dangerous” trip to the moon. Why would a trip to the moon be dangerous?

The article below points out some of the problems of space travel. It also tells some of the ways in which scientists are planning to meet these problems.

This article is very much like some of the chapters that you find in your science books. Learning the best way to read an article of this kind will help you in studying science.

In working with the *social studies* article on pages 4 and 5, you made good use of the headings in boldface type. There are headings in boldface type in this article, also. These boldface headings are on separate lines instead of at the beginning of paragraphs, as they were in the *social studies* article. No matter where boldface headings are placed on a page, you may be sure they are important.

In reading *science*, a boldface heading often gives you a clue to a problem that is going to be discussed. Getting the problem clearly in your mind is the first step to take in studying such material. That is what you will be asked to do in reading the *science* article below.

1. Read the title and think about it.
2. Read all of the boldface headings. See if you can get a clear idea of what the problems of space travel are without reading anything except the headings.
3. Next, read the article all the way through, carefully. Each time you come to a boldface heading that names a problem, read the paragraphs under that heading to find out:
 - a. more information about the problem;
 - b. how the problem may be met.

The airplane flew to a very high **altitude** (a'l'tī tūd).

It was so hot in the hotel the manager put in **air conditioning** (âr kōn dīsh'ūn ĭng).

Mary rubbed the silk with her hand. She heard electricity as a result of the **friction** (frik'shūn).

Mother put eggs, sugar, and flour together. This was a **combination** (kōm bī nā'shūn).

A **pressurized** (prēsh'ēr ĭzd) cabin has normal atmospheric pressure at high altitudes.

The pilot of an airplane uses many **instruments** (in'strōō mēnts).

The degree of hotness or coldness of air is called **temperature** (tēm'pēr á tūr).

A small body that burns as it passes through the atmosphere is a **meteor** (mē'tē ēr).

Objects weigh nothing when they are far up above the earth. This state is called **weightlessness** (wāt'lēs nēs).

When water is boiled, it changes to **vapor** (vā'pēr).

PROBLEMS AND HOW THEY MAY BE MET *

LACK OF OXYGEN

As we climb a mountain or fly up in an airplane, the air gets thinner and colder the higher we go. Above 10,000 feet, or about two miles, the air becomes so thin that human beings can't get enough oxygen to live. Over 90 per cent of the air is in the first 15 miles. The air continues to get thinner until there is no air at all.

This problem of space travel can be met by using pressurized cabins, like those in high-flying airplanes. The men also wear oxygen masks fastened to tanks.

The tanks may be carried on the men's backs, and the oxygen masks worn over their noses.

CHANGES IN TEMPERATURE

At an eight-mile altitude, the temperature is very cold. It is about 65° **below zero**, winter and summer. Much is known about the air at this altitude, because airplanes can fly in it and men are able to gather information.

At about 30 miles up, the temperature becomes very hot. At this altitude it is about 170° **above zero**.

These changes in temperature will have to be met

* Based upon material prepared by Alden W. Smith.

by placing heating systems and air-conditioning units inside the spaceships.

FRICTION

When a rocket is launched from the earth, it moves slowly at first. It does not reach its top speed until it is far up into air so thin that little friction is created. When a rocket comes back to the earth, however, it is moving at top speed. When a rocket moving 18,000 miles an hour strikes the air, the outside of the rocket is heated to 1,320° above zero. The metal in most airplanes would melt at this heat.

Scientists are meeting the problem of friction by making spaceships out of new combinations of metals and other materials that can withstand this terrific heat. They are working, too, on special rocket engines that might be used to slow down a rocket before it reaches the earth. Such engines would not only keep the rocket cool but permit it to land gently.

WEIGHTLESSNESS

Once a rocket leaves the earth behind, the men on board weigh nothing. It is the earth's gravity that gives us weight. Our bodies are so used to gravity that they don't work well without it. Men can get sick if they feel weightlessness for more than a day or two.

Scientists are working on ways to combat this problem. One method is to shorten the time that the crew is weightless. This can be done by making rockets go faster. An atomic-powered rocket would reach Mars or Venus in a few minutes. For journeys that last months or years even at these great speeds, rockets with new shapes may be developed. You all know about the force that keeps water in a pail when you swing the pail around you on a rope. If a doughnut-shaped spaceship were spun, this same force would make a kind of gravity for the men inside. Such

rockets will need to be launched from the moon, which has no air to create friction.

RAPIDLY TRAVELING METEORS

Meteors would be dangerous also. Most meteors are smaller than a pinhead and travel at some 160,000 miles per hour in space. They are hard to see. Even if the pilot should see a meteor coming, it would be very difficult for him to get out of its way. There wouldn't be time to get the ship out of the path of the meteor before the meteor hit it.

One way to meet this problem would be to build an outer shell around the rocket. When a meteor hit this outer shell, the shell would turn into vapor. So would the meteor. The inner shell would be all right.

ACTIVITY 1

On the numbered lines, list the problems of space travel that you have just read about. Below each problem write a possible solution. Try to state each problem and each solution in from one to three words.

- 1. _____

- 2. _____

- 3. _____

- 4. _____

- 5. _____

Studying in Science Books

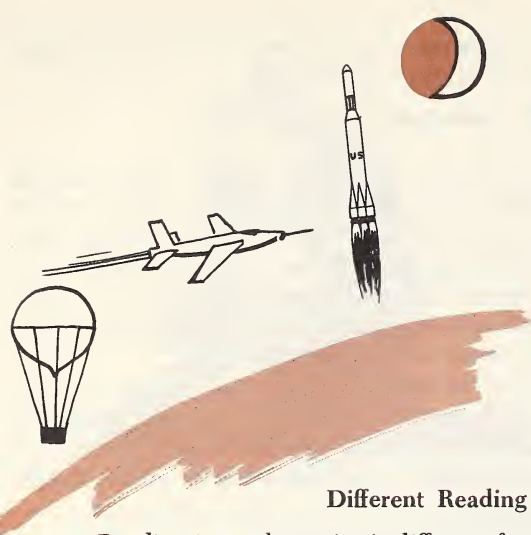
Many of the topics in *science* books deal with problems. These problems are often given in headings in boldface type, as were the problems in the article you just read.

When studying *science*, try to decide whether or not the part of the chapter you are reading deals with problems. If you decide that it does have to do with problems, then do these things in your reading:

- 1. Get each problem clearly in mind. The boldface heading should help you to do this.
- 2. Read to find out:
 - a. more information about the problem;
 - b. how it was solved.

If you get the important information about these two things, in regard to each problem, your reading will be done well.

Remember, however, that this plan of study applies only to the parts of your *science* books that discuss *problems*. You will learn other ways of reading kinds of *science* material which do not deal with problems.



In reading about air or space travel, we often find that numbers are mentioned. Working arithmetic problems with these numbers usually gives us deeper meanings and insights than we might otherwise get. You will find some problems on air and space travel on the next page. The information contained in these problems will be of interest to you.

Different Reading Skills Are Needed in Mathematics

Reading in mathematics is different from reading in the other subjects, first of all, because reading in mathematics calls for much greater exactness. There are many special terms in mathematics, and you must know exactly what each one means. If you're told to find *square rods* and you don't know what they are, you must find out before you do anything else. Then, too, mathematics text is complicated by special symbols ($\times$, $\div$, π , y^2). You must know exactly what each of these symbols means. The numbers also require exact reading. It makes a difference whether you work with 11,010 or 11,001.

Reading in mathematics also requires more orderliness than reading in the other subjects. When you're reading problems, you must read them straight through, without skipping words or sentences as you might in a story. When you're given an explanation for a new process, you need to read each word carefully, making full use of any sample problems or diagrams that are given. When you start to apply the explanation to problems, you should work slowly and carefully, step by step, until you are sure you have the procedure exactly right.

Finally, *reading* in mathematics requires more flexibility than reading in the other subjects. In other subjects, you usually read from left to right across each line, and from top to bottom of the page. In mathematics, once you have read straight through a problem or explanation and know you understand it, you should be able to move your eyes upward, downward, to the left or the right to pick out figures that you need, find formulas to use, and so on.

The following procedure will help you read problems.

1. *Read* the problem carefully enough to be sure you understand it. Take as much time as you need. Try to picture the scene of the problem in your mind. If characters are mentioned, try to see them doing whatever they did in the problem. If one scene is the earth and another the moon, picture both.

2. *Reread* the last sentence of the problem and decide what it asks you or tells you to find out.

3. *Reread* the entire problem, if necessary, to answer the question: What facts are given to work with?

4. Decide what process to use. As a result of all the *reading* you have done, decide whether you are to add, subtract, multiply, or divide.

5. Estimate your answer. Try to think of a sensible answer just by studying the numbers and thinking what the words and sentences tell you to do with them.

After doing all these things in which you use *reading*, you are finally ready to compute the problem. At this point you continue as follows:

6. Set the figures down on paper and make your computations carefully.

7. Compare your answer with the estimate you made while reading.

8. Check your computations.

Naturally, a student who is already good at mathematics won't need to reread as much as a student who has trouble with this subject. If you are one of these fortunate students, you may use the mathematics selections in this book to increase your speed. If you have trouble with mathematics, however, don't try to work for speed until you are getting the right answer to each problem.

On the following page you will have practice with the first two procedures: reading the problem to picture the setting and reading to decide what to find. Practice with others will follow.

Finding What You Are Asked to Do

First, carefully read each problem, trying to picture the setting, the characters, or the objects. After you have done this, very carefully reread the last sentence in the problem. Make sure you know *exactly* what it asks you or tells you to do.

PROBLEMS ON AIR AND SPACE TRAVEL *

Check the phrase which best answers each of the two questions under each problem.

1. Jimmy Neal's trip from the earth to the far-distant moon was made in a three-stage rocket. In getting the rocket ready on earth before it started, men loaded it with fuel. They put in 5,252 tons of fuel for the first stage, 1,746 tons for the second stage, and 87 tons for the final stage. How many tons of fuel had to be loaded for all three stages of the flight?
 - A. What picture did you see?
 - a. Jimmy Neal going to the moon
 - b. the rocket taking off on earth
 - c. men on earth loading the rocket with fuel
 - B. What are you asked to find?
 - a. the number of tons of fuel needed for the first stage of the flight
 - b. the number of tons needed for the second stage
 - c. the number of tons needed for all three stages
2. A balloon called *Explorer II* rose to an altitude of 72,395 feet. If there are 5,280 feet in a mile, how many miles did the *Explorer II* rise into the air?
 - A. What picture did you see?
 - a. a balloon in a hangar
 - b. a balloon sailing very high up in the sky
 - c. a balloon taking off for a flight
 - B. What are you asked to find?
 - a. the number of feet the *Explorer* rose in the air
 - b. the number of miles the *Explorer* rose
 - c. the number of feet there are in a mile
3. A crew of men on a space flight ate 9 pounds of concentrated food each day. How many pounds of concentrated food will they eat in 365 days?
 - A. What picture did you see?
 - a. a crew of men sending up a spaceship
 - b. a crew of men building a space station
 - c. a crew of men eating concentrated food on a space flight
 - B. What are you asked to find?
 - a. the amount of food the men on a space flight ate each day
 - b. the number of pounds they eat in a month
 - c. the number of pounds they eat in 365 days
4. A rocket sent up at White Sands burned its fuel at the rate of 265 pounds per second while it was in the air. At that rate, how long did it take to burn a fuel load of 18,285 pounds?
 - A. What picture did you see?
 - a. a rocket standing in the sand
 - b. an airplane taking off
 - c. a rocket in the air
 - B. What are you asked to find?
 - a. the number of pounds of fuel the rocket burned per second
 - b. the amount of time it took to burn a load of 18,285 pounds of fuel
 - c. the number of pounds of fuel the rocket burned in 265 seconds
5. For a test, a British jet bomber climbed to an altitude of 63,668 feet. Write this altitude correct to the nearest tenth of a mile. (1 mile = 5,280 feet)
 - A. What picture did you see?
 - a. a jet bomber taking off
 - b. a jet bomber flying at a very high altitude
 - c. a jet bomber dropping a bomb
 - B. What are you told to do?
 - a. write the altitude to which this bomber climbed in feet
 - b. write the altitude in miles and feet
 - c. write the altitude in miles and tenths

If you have time, you may now work the problems.

Studying in Your Mathematics Book

You have learned two important things to do when studying problems in your *mathematics* book. Every time you work with problems, be sure to read each problem carefully. As you do so, try to see the picture of the setting and characters or objects which made the problem possible. Then reread the sentence that asks you or tells you what to find. This is the key to the entire problem. Be very sure that you understand it exactly. In *mathematics* you need to read the problem as a whole, then reread parts of it as often as necessary in order to understand the entire problem perfectly.

* Based on problems prepared by Francis J. Mueller.

HOW GOOD ARE YOU AT PRONOUNCING NEW WORDS?

Did you have trouble in working out the pronunciation of any of the words in the reading that you have done so far in this book? Did you have trouble in working out the pronunciation of words in any of your other books today?

The reading you will have to do in school this year won't be easy. It will be much more difficult than any reading you have ever done in the lower grades.

During the year ahead you will meet hundreds of new words in your reading. There will be new words in your *literature* books. You will meet large numbers of new words in your *social studies*, *science*, and *mathematics* books, and in all your other books. Many of these words will be words that you have never heard anyone pronounce. Often they will be long words with several syllables.

In order to get the most out of your reading and study, you should be able to pronounce all of these new words correctly. You can learn to be very successful in working out word pronunciations by yourself. You will be given help in doing this on several pages of this book.

One of the most important things for you to know is the sounds of the different letters and groups of letters. Probably you had work with sounds in the lower grades. Perhaps you have forgotten about this work or have become careless in using it.

At any rate you must know the sounds of letters very well if you are to be able to pronounce the difficult words which you will meet this year. So the sounds of letters and groups of letters will be reviewed in this book. But before you are given a review of sounds, you need to check yourself on the two kinds of letters—vowels and consonants.

Can You Recognize Vowels When You See Them?

In all of the work with sounds in this book we shall talk about *vowels* and *consonants*. You will need to know instantly what a vowel is and what a consonant is. Try yourself out to see how quickly you can recognize vowels.

No doubt you already know that these letters are vowels: a, e, i, o, u, and sometimes y. Every word has one or more vowels in it.

Finding Words That Begin with Vowels

In each of the boxes below there is one word that begins with a vowel. Find that word in each box and underline it.

1. glance voyage ivory	2. office gallon reach	3. carry able guide	4. compass recall olive
5. umbrella period discover	6. country famous import	7. mighty elephant sailor	8. fierce captain utensil

Finding Words That End with Vowels

In each of the boxes below there is one word that ends with a vowel. Find that word in each box and underline it.

1. proof river potato	2. banana basket author	3. voyage punish weather	4. branch animal scale
5. alkali walrus hundred	6. chains sulfa giants	7. desert sudden bacteria	8. dynamo hunger moment

Can You Recognize the Consonants When You See Them?

These letters are consonants: b, c, d, f, g, h, j, k, l, m, n, p, q, r, s, t, v, w, x, z. Sometimes y is a consonant, also.

Underlining Consonants in the Alphabet

Here is the alphabet. Underline each consonant with one line.

a b c d e f g h i j k l m n o p q r s t u v w x y z

Underlining Consonants in Words

Below are some words that you will meet in Unit Two. Draw one line under each consonant in each word.

- | | | | | |
|------------|-------------|--------------|--------------|----------------|
| a. spinal | d. service | g. paragraph | j. lesson | m. selection |
| b. capture | e. symbol | h. scientist | k. enjoyment | n. similar |
| c. gorilla | f. boldface | i. syllable | l. skills | o. information |

Finding Initial Consonants

An initial consonant is one that comes at the beginning of a word. Below you will find several groups of words in boxes. In each box there is one word that begins with a consonant. Find that word and underline it.

1. imagine answer meaning	2. different animals information	3. entire turtle alligator	4. island atmosphere lonely
5. helmet oxygen instrument	6. ages invention rocket	7. balloon ideas autumn	8. exercise happen altitude

Finding Final Consonants

A final consonant is one that comes at the end of a word.

There are three words in each of the boxes below. One word in each box ends with a final consonant. Find that word and underline it.

1. space trip pleasure	2. <i>Nebula</i> blaze tunnel	3. echo tablet George	4. possible rose sheep
5. engine loose lumber	6. improve travel pronounce	7. hydrogen stage lifetime	8. airplane powerful minute

Finding a Consonant in the Middle of a Word

In each of the boxes below there is one word that has a consonant in the middle of it. Find this word in each box and underline it.

1. fuel foot forest	2. total learn coast	3. court music warn	4. toads reach trader
5. produce group floor	6. teeth human leaf	7. cream stood metal	8. sailor about claim

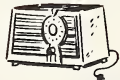
If you missed some of the vowels or consonants, make a list of words from one of your other books. Pick out and write the vowels or consonants in each word in this list. Continue to pick out and write the vowels or consonants in lists of words until you don't miss any at all.

DO YOU KNOW THE SOUNDS OF THE CONSONANTS?

Circling Consonant Sounds

The name of each picture below begins with a different consonant sound.

Look at each picture. Say its name to yourself. With what sound does the name start? Find the letter beneath the picture that stands for that sound. Draw a circle around it.

1.  <u>l</u> <u>t</u> <u>k</u>	2.  <u>b</u> <u>n</u> <u>f</u>	3.  <u>m</u> <u>h</u> <u>j</u>	4.  <u>d</u> <u>z</u> <u>m</u>
5.  <u>b</u> <u>n</u> <u>d</u>	6.  <u>r</u> <u>h</u> <u>l</u>	7.  <u>s</u> <u>f</u> <u>w</u>	8.  <u>v</u> <u>s</u> <u>w</u>
9.  <u>l</u> <u>t</u> <u>k</u>	10.  <u>b</u> <u>s</u> <u>n</u>	11.  <u>m</u> <u>r</u> <u>h</u>	12.  <u>d</u> <u>z</u> <u>v</u>
13.  <u>h</u> <u>r</u> <u>d</u>	14.  <u>n</u> <u>h</u> <u>k</u>	15.  <u>s</u> <u>p</u> <u>w</u>	16.  <u>v</u> <u>z</u> <u>w</u>

Making Use of the Consonants

Below are some words that you will meet in reading the next unit in this book.

Perhaps you know how to pronounce all of these words. If so, draw a circle around the beginning consonant in each one and think about the sound of that consonant.

If you don't know how to pronounce some of the words, try to figure out the pronunciations by doing these things:

1. Look at the beginning consonant and think about its sound.
2. Study the word as a whole.
3. Read the sentence or definition to the right of the word to make sure of its meaning.
4. With these three helps, see if you can tell what the word is.

a. comfortable:	At ease, free from pain or unhappiness.	j. native:	A person's native country is the place where he was born.
b. compute:	To work out a problem with numbers or symbols.	k. service:	Labor that benefits another.
c. discuss:	To talk things over.	l. porpoise:	A sea animal belonging to the whale family.
d. develop:	To unfold, to grow.	m. rodents:	Warm-blooded animals with sharp teeth. Rats are rodents.
e. fortunate:	Lucky.	n. salamander:	A cold-blooded, lizard-like animal.
f. describe:	To tell about something.	o. wilted:	When they are without water, flowers become wilted.
g. key:	An object to unlock a door.	p. zoo:	A collection of animals kept in cages.
h. lungs:	The air-breathing organs of man and other vertebrates.		
i. mammals:	Warm-blooded animals.		

THE CONSONANTS g AND c HAVE TWO SOUNDS

The consonant g has two sounds:

Soft g as in *gem*

Hard g as in *go*

The consonant c has two sounds:

Soft c as in *cent*

Hard c as in *can*

Say the names of the pictures below to yourself. Draw a circle around the word and letter that tell the right sound of each beginning consonant.

1.  hard <u>g</u> soft <u>g</u>	2.  hard <u>g</u> soft <u>g</u>	3.  hard <u>c</u> soft <u>c</u>	4.  hard <u>c</u> soft <u>c</u>
---	---	---	---

If you missed one of the sounds, make a list of all of the words you can think of that begin with that sound. Think about the sound of the first consonant in each of these words.

When May You Expect to Find the Different Sounds of g and c?

When you come to a new word that contains either c or g, you need to know whether the sound has the hard sound or the soft sound. In most words there is a clue that will tell which sound to use in pronouncing the word.

See if you can discover the clues that will tell you which sound to expect. Say each word below. Then write your answers. (Note that *B* and *D* are continued on page 14.)

A.	What vowel comes after <u>c</u> ?	Does <u>c</u> have the hard or soft sound?	C.	What vowel comes after <u>g</u> ?	Does <u>g</u> have the hard or soft sound?
1. cage	_____	_____	1. gate	_____	_____
2. cabin	_____	_____	2. gas	_____	_____
3. cold	_____	_____	3. gold	_____	_____
4. cure	_____	_____	4. gum	_____	_____
5. curve	_____	_____	5. gush	_____	_____
6. curl	_____	_____	6. gulf	_____	_____

Make a rule by filling in the blank spaces:

Usually c has the _____ sound when followed by the vowels _____, _____, and _____.

Make a rule by filling in the blank spaces:

Usually g has the _____ sound when followed by the vowels _____, _____, and _____.

B.	What vowel comes after <u>c</u> ?	Does <u>c</u> have the hard or soft sound?	D.	What vowel comes after <u>g</u> ?	Does <u>g</u> have the hard or soft sound?
1. center	_____	_____	1. gentle	_____	_____
2. ceiling	_____	_____	2. germ	_____	_____
3. cinder	_____	_____	3. giant	_____	_____

B.	What vowel comes after <u>c</u> ?	Does <u>c</u> have the hard or soft sound?	D.	What vowel comes after <u>g</u> ?	Does <u>g</u> have the hard or soft sound?
4. cider	_____	_____	4. gypsy	_____	_____
5. cypher	_____	_____	5. gymnasium	_____	_____
6. cylinder	_____	_____	6. gypsum	_____	_____

Make a rule by filling in the blank spaces:

Usually c has the _____ sound when followed by the vowels _____, _____, and _____.

Make up a rule by filling in the blank spaces:

Usually g has the _____ sound when followed by the vowels _____, _____, and _____.

Now make one rule that is true of both c and g.

Usually c and g have the hard sound when followed by the vowels _____, _____, and _____; and the soft sound when followed by the vowels _____, _____, and _____.

There are a few exceptions to this rule, as in *get*, *girl*, and *give*. In nearly all cases, however, the vowel following c or g will tell you what sound to expect when you are trying to pronounce a new word.

Applying What You Have Learned

Here are some words which you will meet on the next few pages of this book. Decide which sound the c or g has in each one of them, and write *hard* or *soft* on the blank space opposite the word.

	Hard or soft <u>g</u> ?		Hard or soft <u>c</u> ?
A. 1. gorilla	_____	1. cute	_____
2. rage	_____	2. compare	_____
3. kangaroo	_____	3. Congo	_____
4. guide	_____	4. Cameroons	_____

DO YOU KNOW THE LONG AND SHORT VOWEL SOUNDS?

The letters c and g are consonants that have two sounds. But each one of the vowels has several sounds.

The most common vowel sounds are the *long sounds* and the *short sounds*. Key words are given for the long and short sounds in the table below. When you look up words in the dictionary, you sometimes find a short bar like this – above a vowel. This means that the vowel is long. If you find a curved line like this ~ above a vowel, it means that the vowel has the short sound.

Long Sounds

a as in *āte*

e as in *bē*

i as in *līke*

o as in *rōse*

u as in *mūle*

y as in *cry*, respelled with i: *cī*

Short Sounds

a as in *āt*

e as in *bēd*

i as in *sīt*

o as in *hōt*

u as in *cūt*

y as in *crystal*, respelled with *i*: *kriś' tal*

Some of the words on page 15 have long vowel sounds and some have short vowel sounds. Write each word under the right heading, and mark the long or short vowel in each one.

make	had	latch	space	end	best	me	we
land	blaze	flag	plant	demon	need	sent	check
scale	gas	lake	waste	pet	he	men	she

*Long a
Words*

*Short a
Words*

*Long e
Words*

*Short e
Words*

trip	time
smile	ship
grin	hill

Jim	side
shine	file
miles	lift

most	lock
smoke	hot
rocket	comb

nose	bold
problem	bomb
cold	box

*Long i
Words*

*Short i
Words*

*Long o
Words*

*Short o
Words*

use	must
dust	cut
cute	duck

shut	cue
duke	luck
fuel	music

cry	cylinder
system	fly
typical	try

gypsum	sky
crystal	rye
type	mystery

*Long u
Words*

*Short u
Words*

*Long y Words
(Respell with i)*

*Short y Words
(Respell with i)*

Did you get any of the words in the wrong place? If you missed more than one word in the same column, then you need practice. Think of as many words as you can which have that sound and write them in a list. See how long a list you can make.

UNIT TWO

ANIMALS— AT HOME AND ABROAD



John Gorilla ate very well. He had a good *appetite* (ăp'ê tīt).

Many things gathered together make a *collection* (kŏ lĕk'shŭn).

Here is a true story for you to read just for enjoyment. It is about John Gorilla. Try to think of yourself as being in the home where John Gorilla lived. Then imagine that you actually see all of the interesting things that he did, and hear the things that the family said about him.

Read the story just as fast as you can, for the purpose of finding out if the author was right in using the title that he did. In other words, see if you can find proof that this gorilla did live like a human.

John turned the *faucet* (fô'sêt) to get a drink.

John was not *permitted* (pĕr mit'ĕd) to ride in the car.

Alyse (ă lĕs') is a girl's name.

A GORILLA THAT LIVED LIKE A HUMAN*

In December, Major Rupert Penny, of the Royal Air Service, bought a tame gorilla named John. Major Penny had found John in a London department store. It was fortunate that he bought the gorilla just as he did. John, who was two years old at that time, was slowly dying.

John had been suffering in a room that was 85 degrees during the daytime. This was too hot for a gorilla whose native home was in a climate which was much cooler. In the country where John had been born, the temperature was never above 68 degrees, and usually it was even cooler.

Beside having to live in this very hot room, John was left alone in the store at night. All through the nights he cried out with terror and lonesomeness.

Sick and unhappy, little John was taken to the Penny home. He weighed only thirty-two pounds, which was much too light for a gorilla of his age. But the Pennys kept their apartment at about 65 de-

grees, which was very comfortable for John. In this cool, fresh air he grew better at once and developed a healthy appetite.

John was still lonely at night, however. He whimpered and cried a good share of the time as he lay in his dark room, alone.

So Major Penny moved his bed into the room next to John's. He left the door open between the two rooms. After this John was contented and slept soundly all through the nights.

Alyse, Major Penny's niece, took John's feeding in hand. She put a collection of food suitable for him on a high shelf. There were such things as bananas, oranges, apples, grapes, raisins, currants, dates, berries, and a very few nuts. John regarded this as forbidden fruit and enjoyed stealing it. Too, this was the kind of food that any gorilla would like!

Milk was John's mainstay. At first he drank a quart a day, later three and one-half quarts. He loved roses—to eat! If they were the least bit wilted, however, he would not touch them.

All this time John was feeling fine and growing rapidly. He had a real bed in his room, and he always

* Adapted from "A Gorilla That Lived Like a Human," by William T. Hornaday, *The Mentor*, Vol. 9, No. 10 (November 1921), pp. 30-31.

climbed into it at 8 o'clock. He loved to stand on the top rail at the foot and jump down upon the mattress—like any boy.

John liked to play games with Major Penny, hide-and-seek, or blindman's-buff. In the dark he was somewhat afraid. He would never go into a dark room without turning on the light, even when he was playing hide-and-seek.

He could turn on a faucet to get a drink. He was always careful to turn off the water when he had finished. He delighted in getting into a warm bath and sponging himself. He was able to turn the bath water on and off without help.

At meal times John sat at the table and behaved well. He ate slowly and never snatched things. He always took tea in the afternoon and drank much water.

No one ever tried to teach John any tricks. He just did what he saw others in the family doing, and learned to live as human beings live.

John seemed to think that everyone was delighted to see him. He used to open the window whenever he was permitted. If he found the sash locked, he would unlock it. When a big crowd gathered outside, he would beat his chest and clap his hands in glee.

When told, he would always come in, shut the window, and lock it. But he was afraid to have others in the family near a window. If he saw someone standing at an open window, he would rush to their side and push them away.

This is the cleverest thing John ever did: Alyse

was dressed to go out to a party, and sat down for a moment. John came to her and wanted to sit in her lap.

"Don't let him! He'll spoil your dress," Mrs. Penny cried.

When Alyse said, "No, John. You can't come," he threw himself on the floor and cried like a baby. After a minute or two he stopped crying, looked about, and found a newspaper. He carried the paper to Alyse, spread it on her lap, climbed up, and happily sat down.

"Even those who saw this said they would not have believed it, had they not seen it themselves," said Alyse later. "Both Major Penny and Mrs. Penny were in the room and can swear that this really happened."

In March John weighed one hundred and twelve pounds and stood three feet, four and one-half inches high. He had become, as Alyse often said, "quite a handful." He was getting much too big to live in a house. And no one outside of the family could manage him.

At this time a man offered to buy John from Major Penny. The man wanted to take the gorilla to live in a beautiful garden in Florida and promised to take good care of him. So Major Penny agreed to let him go.

The Penny family hated to part with their pet, but they knew it was for the best. Mrs. Penny and Alyse patted him on the back. Major Penny shook his hand.

"Good-by, old fellow," the Major said.

ACTIVITY 1—PROOFS, PROBLEMS, AND REASONS

1. Name six things which John did which prove that he lived like a human.
a. _____
b. _____
c. _____
d. _____
e. _____
f. _____
2. Is there any proof in this story that John liked to be with or near human beings? _____
3. If so, what is the proof? _____

4. A Mr. R. M. Yerkes, who spent much time in studying gorillas, believed that these animals showed ability in solving problems.

Did John do anything in this story which would lead you to believe that he could solve a problem? If so, tell what the problem was and how he solved it.

What was the problem? _____

How did John solve it? _____

5. Do you think it was wise not to teach John Gorilla how to do tricks? _____
Give the reason for your answer. _____

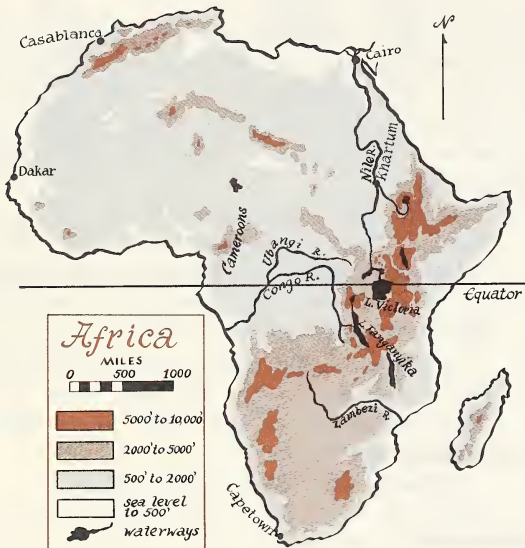
JOHN GORILLA'S NATIVE HOME

You have read about John Gorilla's home with the Penny family. Would you like to know something about John's home before he was captured?

The maps on these pages will tell you a great deal about John's native home. Of course, you won't read these maps in the same way that you read a story or an article. Stories and articles use word symbols to give you meanings. Maps use different kinds of symbols to give you information.

See how much information you can find out about John Gorilla's native home just from reading these maps, alone.

In working with these two pages, read the question in each boldface heading. Then see if you can find the answer to the question by reading the maps.



There are some mountains in Africa called the *Cameroons* (kăm ěr õonz').

A lake in Africa is called *Lake Tanganyika* (tăn'găn yě'kă).

WHERE DO WILD GORILLAS LIVE?

The key to the map tells you what continent this is.

What continent is it? _____

The native home of gorillas is in Africa. There are two different types of gorilla, and the native home of each type is a different place.

One type of gorilla has its native home in a 500-mile square south of the Cameroons. The Cameroons are mountains that were once volcanoes. There are no gorillas in these mountains. The gorillas live south of the Cameroons.

Find the Cameroons. Then look at the scale of miles to the left of the map. With a ruler, measure the length on the scale which represents 500 miles. Mark this length on a piece of paper. Now placing the paper just below the Cameroons, mark off a square of 500 miles on the map. One type of gorilla has its home within this square.

Now find Lake Tanganyika. Find a small lake with no name just north of Lake Tanganyika. Now find a narrow strip of dark brown land surrounding this small lake. This narrow strip of land is where the other type of gorilla has its native home.

This strip of land is only about 200 miles wide. Use the scale of miles to find how long it is.

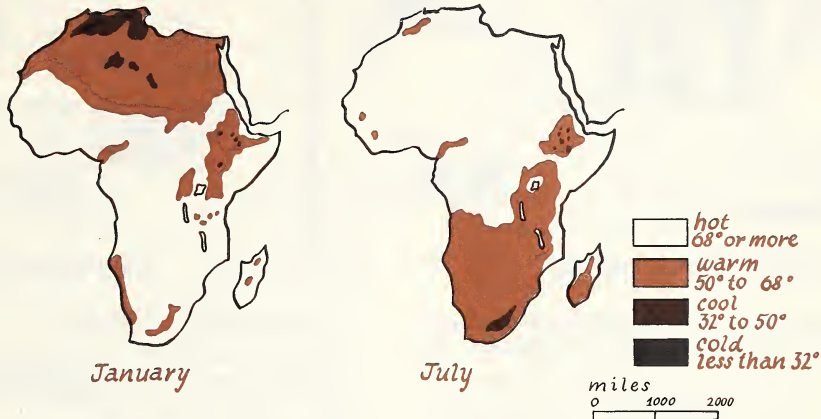
- How long is this strip of land? Underline the right answer.
a. 600 miles b. 250 miles c. 100 miles
- Look at the key that shows the altitude of the land in feet. Match the color of one of the oblongs in the key with the color along the coast in the 500-mile square. How high is land of that color on the map?
a. 5,000 feet b. below sea level
c. sea level to 500 feet
- Now match one of the oblongs with the color next to the white space along the coast. How high is the land in this part of the 500-mile square?
a. 1,000 feet above sea level
b. 500 to 2,000 feet above sea level
c. below sea level
- In the same way find how high the land is in the narrow strip where the other gorillas live. How high is it?
a. 1,000 to 2,000 feet b. 5,000 to 10,000 feet
c. more than 10,000 feet

WHAT TYPE OF GORILLA WAS JOHN GORILLA?

One type of gorilla is often called "the lowland gorilla." The other type is often called "the highland gorilla."

As a result of reading the map, where do you think each of these types lives in Africa?

Underline the phrase that completes each sentence:



WAS JOHN GORILLA A LOWLAND GORILLA OR A HIGHLAND GORILLA?

You will need to read two temperature maps in order to answer the question above.

- Match one of the oblongs in the key to the 500-mile square where the lowland gorillas live.

What is the average monthly temperature in January?

- hot—68 degrees or more
- cold—less than 32 degrees

- In the same way, find the average January temperatures of the country where the highland gorillas live.

What are these average temperatures?

- hot—68 degrees or more
- warm—50 degrees to 68 degrees

- Now look at the temperature map for July.

What is the average July temperature for the part of the country where the lowland gorillas live?

- cool—32 degrees to 50 degrees
- hot—68 degrees or more

- The highland gorillas live:
 - in the northern part of Africa
 - on a 500-mile square south of the Cameroons
 - on a narrow strip north of Lake Tanganyika
- The lowland gorillas live:
 - in South Africa
 - on a narrow strip north of Lake Tanganyika
 - on a 500-mile square south of the Cameroons

- What is the average July temperature where the highland gorillas live?

- hot—68 degrees or more
- warm—50 degrees to 68 degrees

- Compare the average July and January temperatures of the land where the lowland gorillas live. Underline the right answer:

- It changes greatly between summer and winter.
- It is about the same all year.

- Compare the average July and January temperatures of the land where the highland gorillas live. Underline the right answer:

- It is about the same all year.
- It changes greatly between summer and winter.

- In the story, you read that John Gorilla suffered in a temperature of 85 degrees. Then you were told the temperatures of his native home. With that information in mind, do you think John was a lowland gorilla or a highland gorilla? Underline your answer:

- lowland gorilla
- highland gorilla

Read Maps When You Are Studying

When you study a new chapter in *geography* or *history* or *social studies*, you often find maps on the pages. If you read these maps carefully, they will tell you many things. Instead of skipping the maps and starting to read the content at once, examine the maps first of all. Get all of the information that you can from the maps. Then start reading the chapter. You will understand and remember better what you read in the chapter if you have first studied the maps.

TO WHICH CLASSIFICATION DOES JOHN GORILLA BELONG?



WARM-BLOODED ANIMALS

When scientists arrange things in groups or classes they use the method of *classification* (klás'í fī kā' shŭn).

An animal having a spinal cord is a *vertebrate* (vŭr'tē brăt).

When a word is printed like *this* it is said to be *italicized* (ī tál'ī sīzd).

One classification of vertebrates is named the *marsupials* (măr sŭ'pī ālz).

Animals who do not have a spinal cord are *invertebrates* (in vŭr' tē brāts).

Study the picture carefully. Note the animals that you find above each heading in the picture.

Read the headings in boldface and italicized type throughout the entire article. Italicized type looks like this: *Marsupials*.

Quickly read the boldface and italicized headings. Then do Activity 1.

After you have read the headings and done Activity 1, read the article carefully. Think of the question in each center boldface heading. Then read to find the answer to the question.



COLD-BLOODED ANIMALS

Snakes are *reptiles* (rĕp'tīlz).

Frogs are *amphibians* (ām fib'ī ānz).

There is a tool with a cutting edge at the end of a blade. This is a *chisel* (chīz'l).

Animals that feed their young milk are called *mammals* (mām'ālz).

Rats, beavers, squirrels, and rabbits are *rodents* (rō'dĕnts).

Man is classed as a *primate* (prī'mīt).

One kind of ape which lives in Africa is the *chimpanzee* (chĭm'pān zĕ').

CLASSIFICATION OF VERTEBRATES *

HOW DO SCIENTISTS CLASSIFY ANIMALS?

Vertebrates and Invertebrates. Scientists do the same thing in classifying animals that you do in classifying stamps, or pictures, or pressed flowers. Let's see just how they do this.

The first sorting-out is done by asking the question, "Has this animal a backbone with a spinal cord or not?" If it has, it is called a *vertebrate*. If not, it is an *invertebrate*. These are the two large groups of animals. Each of these large groups is then divided into smaller groups in which there are animals that are alike in certain ways.

* Based upon material prepared by Leo Schneider.

We know to begin with that John Gorilla had a backbone with a spinal cord. Every gorilla has a backbone and spinal cord very much like the backbone and spinal cord of a man. Because John had a spine, we can tell at once that he belongs to the large group of vertebrates. What we need to find out is the particular group of the several groups of vertebrates to which John belongs.

WHAT ARE SOME CLASSES OF COLD-BLOODED VERTEBRATES?

One group of vertebrates is cold-blooded. Some of the cold-blooded vertebrates that you know best are described on page 21. Read to find out how the dif-

ferent groups of cold-blooded vertebrates are alike and how they are different.

Fishes. Fishes are water animals, and they are cold-blooded. They have no lungs, but they breathe through their gills. They are covered with scales, and they have fins which they use for swimming. Goldfish, salmon, trout, bass, and sharks are examples of this class of vertebrates.

Amphibians. These are also cold-blooded animals. They are different from fish in that they have no scales. Nor do they stay in water all the time, as do fish. They spend part of their lives in the water and part on land. So they need to have both gills for breathing in water and lungs for breathing on land. Frogs, toads, and salamanders are all amphibians.

Reptiles. These animals, like fishes, are cold-blooded, and they do have scales. They are different from both fishes and amphibians, however, in that they never have gills. They have lungs, and they breathe through them from the time they are born. Snakes, turtles, and alligators are all reptiles.

WHAT ARE SOME CLASSES OF WARM-BLOODED VERTEBRATES?

Another large group of vertebrates is the group to which warm-blooded animals belong. Under the large group of vertebrates, there are two important classes: birds and mammals.

Birds. These animals are warm-blooded. They have wings, and they are covered with feathers.

Some, like the hummingbird, weigh less than a penny. Others, like the ostrich, which cannot fly, weigh as much as 300 pounds. Sparrows, robins, blue jays, crows, pigeons, eagles, and all other kinds of birds belong to this class.

Mammals. The mammals are warm-blooded animals. All of them except the sea-going mammals are covered with hair or fur. They feed their babies with milk. There are many groups in this class. A few of them are given below.

1. **Marsupials.** These animals carry their young in a pouch. The kangaroo and the opossum are examples of marsupials.
2. **Seagoing Mammals.** Whales and porpoises belong to this group. Perhaps you have always thought of whales and porpoises as fishes. These animals, however, are mammals because they have lungs and breathe air, do not have scales, and have flesh-covered "hands" or flippers of the five-fingered type. They also give birth to their young like other mammals, and feed their babies with milk. These are the reasons that scientists classify whales and porpoises as mammals.
3. **Rodents.** These animals are the fur-covered mammals that have sharp, chisel-shaped teeth. Rats, beavers, rabbits, and squirrels are rodents.
4. **Primates.** The members of this group have hands, and some of them can stand upright on two feet. Monkeys, gorillas, chimpanzees, and man belong to the primate group.

ACTIVITY 1

Try to answer these questions after you have studied the pictures and read the headings.

1. Name six cold-blooded animals:

a. _____ b. _____
c. _____ d. _____
e. _____ f. _____

2. Name six warm-blooded animals:

a. _____ b. _____
c. _____ d. _____
e. _____ f. _____

3. Place a check mark before the questions below to which you think you will find the answers when you have read the article.

- a. What is the classification method?
- b. To which classification does John Gorilla belong?
- c. How do scientists solve problems?
- d. How do scientists classify animals?
- e. Why should everyone study *science*?
- f. What are some classes of cold-blooded vertebrates?
- g. What are some classes of warm-blooded vertebrates?

ACTIVITY 2

Draw a line from the name of each of the animals below to the name of the classification to which it belongs:

Cold-Blooded Vertebrates

frog	fishes
snake	reptiles
fish	amphibians
turtle	
alligator	

Warm-Blooded Vertebrates

monkey	rodents
squirrel	marsupials
whale	primates
kangaroo	sea-going mammals
rabbit	

JOHN GORILLA—A BIG EATER

On this page you will find some problems about John Gorilla and other gorillas.

You have already learned that you should read *mathematics* differently than you read *literature*, *social studies*, or *science*. On page 8, five procedures were given that should be helpful to you.

1. The first step is to read the entire problem to get a picture of the scene where the *arithmetic* problem took place. You had practice in doing that.

2. The second step is to reread the sentence that asks you or tells you what to do. You were given practice in using this step also.

In working with these new problems, you will have more practice in reading to do the two things above; and in addition you will have practice in doing a third step:

3. The third step is to read again the sentences that have numbers in them to find out what facts the problem gives you to work with.

You will have to write your own answers to the first two questions under each problem. Three possible answers will be given for the third question under each problem. Check the one that is right.

PROBLEMS ABOUT GORILLAS *

1. In one day John Gorilla ate $3\frac{3}{4}$ pounds of oranges and $2\frac{1}{2}$ pounds of apples. How many pounds of fruit did John eat that day?

A. What picture did you see? _____

B. What does the last sentence ask you to find? _____

C. What facts does the problem give you to work with?

- a. $2\frac{1}{2}$ pounds of oranges, $3\frac{3}{4}$ pounds of apples
- b. $3\frac{3}{4}$ pounds of oranges, $2\frac{1}{2}$ pounds of apples

2. John Gorilla ate $\frac{1}{4}$ of a bunch of grapes for breakfast and $\frac{1}{2}$ of the bunch for lunch. How much of the bunch did he have left for supper?

A. What picture did you see? _____

B. What does the last sentence ask you to find? _____

C. What facts are you given to work with?

- a. $\frac{1}{2}$ bunch of grapes and $\frac{1}{2}$ bunch of grapes
- b. $\frac{1}{4}$ bunch of grapes and $\frac{1}{2}$ bunch of grapes
- c. $\frac{1}{4}$ bunch of grapes and $\frac{1}{2}$ bunch of grapes

3. Alyse found that in one week John Gorilla went from $88\frac{1}{2}$ pounds to $91\frac{1}{4}$ pounds. How many pounds did the gorilla gain this week?

A. What picture did you see? _____

B. What does the last sentence ask you to find? _____

C. What facts are you given to work with?

- a. $80\frac{1}{2}$ pounds and $92\frac{1}{2}$ pounds
- b. $88\frac{1}{2}$ pounds and $91\frac{1}{4}$ pounds
- c. $88\frac{1}{2}$ pounds and $91\frac{1}{2}$ pounds

4. The 32 pounds that John Gorilla weighed when he first lived with Major Penny was $\frac{2}{3}$ of his weight a year later. How much did John Gorilla gain?

A. What picture did you see? _____

B. What does the last question ask you to find? _____



* Based upon problems prepared by F. J. Mueller.

- C. What facts are given you to work with?
- 1 year and 32 pounds
 - 32 pounds, $\frac{1}{2}$ of John's weight later
 - 30 pounds, $\frac{1}{2}$ of John's weight later
5. John Gorilla drank $3\frac{1}{2}$ quarts of milk a day. How many days will it take him to drink 56 quarts of milk?
- A. What picture did you see? _____
- _____
- B. What does the last sentence ask you to find?
- _____
- _____
- C. What facts are given you to work with?
- $3\frac{1}{2}$ quarts of milk and 56 quarts
 - $3\frac{1}{2}$ quarts of milk and 75 quarts
 - $3\frac{1}{2}$ quarts of milk and 65 quarts
6. A zoo bought 4 gorillas whose total weight amounted to $\frac{1}{2}$ ton. One pair together weighed $\frac{1}{2}$ ton. How much did the other pair weigh?
- A. What picture did you see? _____
- _____
- B. What does the last sentence ask you to find?
- _____
- _____
- C. What facts are you given to work with?
- $\frac{1}{2}$ ton and $\frac{1}{2}$ ton
 - $\frac{1}{2}$ ton and $\frac{1}{2}$ ton
 - $\frac{1}{2}$ ton and $\frac{1}{2}$ ton
7. One gorilla in the zoo weighed 420 pounds. He ate 105 pounds of food in one week. What fraction of his weight did the gorilla eat that week?
- A. What picture did you see? _____
- _____
- B. What does the last sentence ask you to find?
- _____
- _____
- C. What facts are you given to work with?
- 405 pounds and 120 pounds
 - a fraction, 420 pounds, and 105 pounds
 - 420 pounds and 105 pounds
8. An explorer came upon a family of 96 gorillas. If 72 were males, what fraction of the family were females?
- A. What picture did you see? _____
- _____
- B. What does the last sentence ask you to find?
- _____
- _____
- C. What facts are you given to work with?
- 92 gorillas and 76 gorillas
 - 96 gorillas and 72 gorillas
 - 96 families and 72 gorillas
9. In the Cameroons it rains 8 months of the year. In the lowlands it rains $\frac{1}{2}$ of the year. Do the Cameroons have a longer or shorter rainy season than the lowlands?
- A. What picture did you see? _____
- _____
- B. What does the last sentence ask you to find?
- _____
- _____
- C. What facts are you given to work with?
- 12 months and 8 months
 - 8 months and $\frac{1}{2}$ of a year
 - 8 months and $\frac{1}{2}$ of a year
10. John's native home in highland Gorilla-land is on a strip of land 250 miles long. The home of the lowland gorillas extends along the coast for 500 miles. What fractional part of the length of the lowland strip is the length of the highland strip?
- A. What pictures did you see? _____
- _____
- B. What does the last sentence ask you to find?
- _____
- _____
- C. What facts are you given to work with?
- 250 miles and 500 miles
 - 150 miles and 400 miles
 - 225 miles and 550 miles

Reading Problems in Your Mathematics Books

Whenever you start to read a problem in your *mathematics* book, do three things first of all:

1. Read the problem to see if you can picture in your mind the scene where the problem took place.
2. Reread the last sentence to make *very* sure that you know what this sentence asks you or tells you to find.
3. Reread to find out what facts the problem gives you with which to work.

DO YOU KNOW THE SOUNDS OF THE CONSONANT BLENDS?

Many words begin with the sound of just one consonant. Others begin with the sound of two consonants or sometimes three consonants, all blended together into one sound.

If you are to be able to work out the pronunciation of new words quickly, you must be very sure that you know the sounds of the consonant blends. Try yourself out in working with the pictures and sounds below.

Look at each picture. Say its name to yourself. With the sound of what consonant blend does it begin? Find under the picture the letters that stand for that sound. Circle the correct letters.

1.  <u>pl</u> <u>gr</u> <u>dr</u>	2.  <u>fr</u> <u>gl</u> <u>gr</u>	3.  <u>tr</u> <u>tw</u> <u>sp</u>	4.  <u>pl</u> <u>cl</u> <u>pr</u>	5.  <u>sc</u> <u>cr</u> <u>st</u>
6.  <u>st</u> <u>tr</u> <u>fr</u>	7.  <u>pl</u> <u>gl</u> <u>gr</u>	8.  <u>sl</u> <u>cl</u> <u>st</u>	9.  <u>gl</u> <u>sm</u> <u>sl</u>	10.  <u>fr</u> <u>fl</u> <u>cr</u>
11.  <u>bl</u> <u>sk</u> <u>br</u>	12.  <u>pl</u> <u>gl</u> <u>gr</u>	13.  <u>sl</u> <u>sn</u> <u>st</u>	14.  <u>sk</u> <u>sw</u> <u>st</u>	15.  <u>fl</u> <u>br</u> <u>sn</u>
16.  <u>sl</u> <u>sk</u> <u>dr</u>	17.  <u>fr</u> <u>sk</u> <u>sm</u>	18.  <u>gl</u> <u>sc</u> <u>cl</u>	19.  <u>st</u> <u>sk</u> <u>sn</u>	20.  <u>sk</u> <u>pr</u> <u>sp</u>
21.  <u>tw</u> <u>tr</u> <u>sk</u>	22.  <u>pr</u> <u>st</u> <u>cl</u>	23.  <u>spr</u> <u>str</u> <u>scr</u>	24.  <u>str</u> <u>spr</u> <u>scr</u>	25.  <u>scr</u> <u>str</u> <u>spr</u>
26.  <u>str</u> <u>scr</u> <u>spr</u>		27.  <u>str</u> <u>thr</u> <u>scr</u>		28.  <u>scr</u> <u>str</u> <u>spr</u>

If you missed any of the blends, write the name of the picture used for the blend you missed. Think of as many other words as you can which begin with that blend. Make a long list. Think of the beginning sound of each word as you write it.

Do this with each sound that you missed.

DO YOU KNOW THE SPEECH SOUNDS?

There is a difference between consonant blends and speech sounds. In a blend, such as bl in *black*, you hear a little of each of the two letters blended together. A speech sound gives a new sound entirely, and neither one of the two letters is heard. Ch is a speech sound. When you say the word *church* you do not hear the c or the h. You hear an entirely new sound.

The speech sounds that are used most often are: wh, th, sh, ch, qu, ng, nk. See if you know these sounds.

Speech Sounds at the Beginning of Words

Name each of the pictures below. Draw a circle around the first two letters that represent the speech sound with which the word begins:

1.  <u>wh</u> <u>th</u> <u>sh</u>	2.  <u>th</u> <u>ch</u> <u>wh</u>	3.  <u>wh</u> <u>th</u> <u>sh</u>	4.  <u>ch</u> <u>qu</u> <u>th</u>	5.  <u>wh</u> <u>th</u> <u>ch</u>
---	--	--	--	--

Speech Sounds at the End of Words

The speech sounds th, ch, sh sometimes come at the end of words. The speech sounds nk and ng always come at the end of words.

Circle the speech sound with which the name of each of these pictures ends:

1.  <u>th</u> <u>wh</u> <u>ch</u>	2.  <u>ch</u> <u>th</u> <u>sh</u>	3.  <u>th</u> <u>wh</u> <u>sh</u>	4.  <u>ch</u> <u>nk</u> <u>ng</u>	5.  <u>ng</u> <u>ch</u> <u>wh</u>
--	--	--	--	--

Extra Practice

If you missed any of the sounds in the boxes, make a list of words containing each of those sounds. Think about the sound as you write each word.

If the sounds you missed are beginning sounds, you might give yourself some additional practice by writing lists of dictionary words that begin with those speech sounds. Think about each speech sound as you write it and try to pronounce the new words.

More About Speech Sounds

The consonant q never has a sound by itself. It always appears with u, making the speech sound qu.

The speech sound wh has two sounds, as in *what* and in *who*. In nearly all words beginning with wh, this speech sound has the sound that it has in *what*. You will rarely find the sound of wh as in *who*.

The speech sound th has two sounds, also. It nearly always has the sound of th, as in *those*. Once in a great while, however, you will find a word in which th has a sound as in *thin*.

Ph is also a speech sound. Ph usually has the sound of f, regardless of whether it is at the beginning of a word or at the end. Notice the f sound of ph as you pronounce these words: *photograph*, *lymph*.

Another speech sound is gh, and this is a very tricky one. It has a sound of hard g when it comes at the beginning of a word, as in *ghost*. When it comes at the end of a word it may have the sound of f, or it may not be sounded at all.

Read these words and try to hear the f sound of gh: *laugh*, *cough*, *tough*.

Read these words and decide whether or not gh has any sound at all: *though*, *bough*, *through*.

MAKING USE OF BLENDS AND SPEECH SOUNDS

If you know the sound of the first blend or speech sound in a word, this gives you an excellent start in working out the pronunciation of the word. Reading through a sentence and trying to think what the new word would have to be in order to complete the meaning is helpful. Using the two clues together—the beginning sound plus the meaning clue—is doubly helpful.

Below are some words you will meet in reading the next unit in this book. A meaning is given for each word, either in a sentence containing the word or in a definition.

In working out the pronunciation of the words, do these things for each word.

1. Underline the beginning blend or speech sound, and think how you would start to say the word.
2. Study the word as a whole.
3. Read the meaning of the word.
4. Pronounce the word.

If you already know how to pronounce many of these words, underline the beginning blend or speech sound in each one just the same, and think about the sound that each blend or speech sound has as you pronounce the words. This will help you when you come to new words that you can't pronounce. The first speech sound has been underlined for you.

- | | |
|---------------------|--|
| 1. <u>Th</u> orfin: | The name of a boy from Norway.
The <u>th</u> sounds like <u>th</u> in <i>thin</i> . |
| 2. crashed: | The car crashed into a tree. |
| 3. sneered: | The man did not approve of what
Thorfin was doing. He raised his
upper lip and sneered at Thorfin. |
| 4. chore: | A small task or job. |
| 5. Spain: | A country in Europe. |
| 6. trusted: | Thorfin would do everything he was
told to do. He could be trusted. |
| 7. swung: | The boy swung in a rope swing. |
| 8. proper: | The girl always tried to do the right
thing. She tried to be proper in all
she did. |
| 9. claim: | Each explorer wanted to claim new
land for his country. |
| 10. stretch: | The boy tried to stretch the rubber
band so that it would go around a
package of papers. |
| 11. thrilling: | Thorfin had an exciting or thrilling
time. |
| 12. bronze: | A metal made of copper and tin. |
| 13. stern: | The back end of a ship. |
| 14. trudge: | To walk wearily. |
| 15. blocking: | Preventing passage. |
| 16. group: | Two or more objects, people, or ani-
mals gathered together. |
| 17. scowl: | A wrinkling of the brow; a frown. |

Finding Different Sounds of the Same Speech Sound

1. Underline the speech sound gh with one line in words in which it has the sound of f. Underline gh with two lines in words in which it is silent.

rough thorough though fought enough brought

2. Underline the speech sound wh with one line in words in which it has the sound of wh as in *what*.

Underline wh with two lines in words in which it has the sound of wh as in *who*.

whistle whom wheat whoop which whole

MORE ABOUT VOWELS

You had some work with long and short vowels on pages 14 and 15. There is much more that you should know about vowels if you are to be able to pronounce the many new words that you will meet in your reading this year.

For one thing, when you come upon a new one-syllable word how can you tell whether the vowel or vowels in it are long or short? You will be given practice in deciding which vowels are long and which are short in the activities below.

One-Syllable Words Ending in e

Write one word to answer each of the questions in the headings.

	<i>Is the first vowel long or short?</i>	<i>Is there an <u>e</u> at the end of the word?</i>	<i>Is the <u>e</u> silent or sounded?</i>
1. ate	_____	_____	_____
2. bite	_____	_____	_____
3. hope	_____	_____	_____
4. use	_____	_____	_____

What conclusion do you draw from the work you just did?

Fill in the words that are necessary to complete Principle No. 1 below. The word *principle* is just another word for *rule*.

Principle No. 1

When a word contains two vowels, one of which is final _____, the first vowel is usually _____, and the final e is _____.

One-Syllable Words with One Vowel

Write one-word answers to the questions in the headings:

	<i>Is the vowel sound long or short?</i>	<i>Is there a vowel at the end of the word?</i>
1. at	_____	_____
2. bit	_____	_____
3. hop	_____	_____
4. us	_____	_____

Principle No. 2

When there is only one vowel in a word and that vowel is not at the end of the word, the _____ is usually _____. (There are many exceptions to this principle, for example, *sir*, *all*, *art*, and others.)

MORE ABOUT VOWELS, CONTINUED

Two Vowels Together in a One-Syllable Word

Answer the question in the first heading with a number. The other questions may be answered *first* or *second*.

	<i>How many vowels together in the word?</i>	<i>Which vowel has a long sound?</i>	<i>Which vowel is silent?</i>
1. toad	_____	_____	_____
2. beast	_____	_____	_____
3. train	_____	_____	_____
4. float	_____	_____	_____
5. hay	_____	_____	_____
6. real	_____	_____	_____
7. throat	_____	_____	_____
8. reach	_____	_____	_____
9. seal	_____	_____	_____
10. beam	_____	_____	_____
11. load	_____	_____	_____

Principle No. 3

When two _____ come together in a word, the first _____ is usually _____, and the second is usually _____.

Words You Will Meet in the Next Unit

Below are some words that you will meet in reading the next unit in this book.

Decide how to pronounce each word. Write the number of the principle that you used.

<i>Which prin- ciple did you use?</i>		<i>Which prin- ciple did you use?</i>		<i>Which prin- ciple did you use?</i>	
1. cove	No. _____	6. sail	No. _____	11. strip	No. _____
2. note	No. _____	7. deal	No. _____	12. lungs	No. _____
3. tame	No. _____	8. coast	No. _____	13. gills	No. _____
4. scale	No. _____	9. mean	No. _____	14. class	No. _____
5. type	No. _____	10. teach	No. _____	15. stamp	No. _____

Applying What You Learned

Whenever you meet a one-syllable word and are not sure of its pronunciation, study it to see: (1) if it contains two vowels, one of which is final *e*; (2) if it contains only one vowel; or (3) if it contains two vowels together. Then you will know whether the vowel is long or short and how to pronounce the word.

There are exceptions to these rules. A vowel may have many sounds other than the long and short sounds. We shall discuss these other sounds later. In the meantime, you will find the three principles with which you have been working to be very helpful.

HOW TO READ FAST

Everyone would like to read faster. Everyone *can* read faster. *You* can increase your own speed greatly. On this page, we'll give you a little start in learning to read faster.

The Cornerstones of Speed

(1) Pronouncing new words correctly, (2) getting meanings accurately, and (3) using study skills effectively—these are the cornerstones of speed. In fact, you never can read very fast until you learn to do all of these things well. So, everything that you do in this book will help you to read faster. As you gain in ability to do each of these three important things, however, you will also be given special help in developing your speed. Then you will have a chance to grow in all reading ways at once.

Good Reading Habits

Sometimes, as boys and girls pass through the elementary grades, they develop some bad habits that prevent them from reading fast. If you have any of these bad habits, start at once to break them and begin to build good habits in their place.

1. Do you move your lips while you are reading? If your answer is "Yes," break yourself of this lip-movement habit at once. You can never read fast as long as you say each word with your lips.

Try placing your finger or a pencil over your lips while you are reading. Every time you feel your lips

moving, press them with your finger or pencil and *hold them still*.

2. Do you point to the words as you read? If your answer to this question is "Yes," start breaking this habit at once. Your mind can leap ahead and read much faster than you can point to words. Don't hold it down with finger-pointing.

Try taking hold of each side of the book with one hand. *Keep both hands in use holding the book*, and your finger won't be free to point.

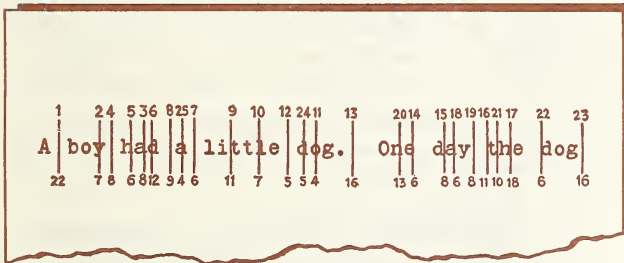
3. Do you move your head while reading? Some people move their heads from left to right and back again from right to left each time they read a line and return their eyes to the beginning of another line. This head movement prevents fast reading.

If you have this habit, try placing your chin in *one* hand as you read. *Make your hand keep your head from moving*.

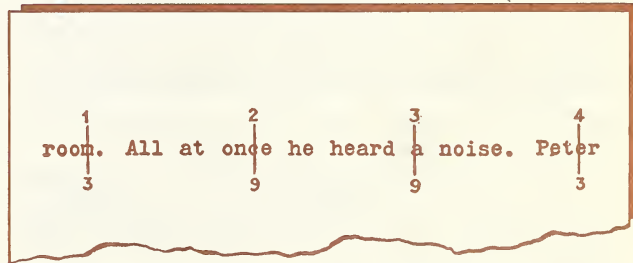
The Real Secret of Fast Reading

The real secret of speed reading is to gather in as many words as you possibly can at each glance. Learn to read for ideas, not just to look at each word at a time.

Cameras have been rigged up to take pictures of people's eye-movements while reading. Below is a picture of the eye-movements of a poor reader, and those of a good reader. The short lines show where the eyes paused or fixated as they passed over the line of print.



Poor Reader



Good Reader

The eyes of the poor reader paused 25 times in reading one line. The eyes of the good reader paused only four times in reading the line. We read at the time our eyes pause, not when they are moving.

You may be sure that it took the poor reader a very long time to read a page.

On the other hand the good reader probably read a page rapidly because he gathered several words at

each glance. It would take much longer to pause 25 times in a line than to pause four times.

Applying What You've Learned About Reading Fast

In reading stories in *literature*, or newspaper or magazine articles, start at once to move your eyes rapidly across each line and pick up as many words as possible at each glance.

UNIT THREE

GREAT PATHFINDERS



Here is another story that you will enjoy reading. Thorfin is the boy hero in this story. Put yourself in Thorfin's place and try to feel the way he felt when he had hardships and when he had happy times.

This will be easy reading for you, so try to read the entire story as fast as you can. Take in whole groups of words at each glance and move your eyes rapidly over the lines. But don't go so fast that you cannot get the meanings or enjoy the story.

A man belonging to a group of Northmen who sailed the seas in about 1,000 A.D. was called a **viking** (vī'king).

One very famous viking was **Leif Ericson** (lēf ər'ik sūn).

The name of a man in the story is **Magnus** (māg'nūs).

A land on the northeastern coast of North America opposite Newfoundland is called **Labrador** (lāb'rā-dōr). It belongs to Newfoundland.

A man who sails or helps to sail a ship is called a **mariner** (mār'ī nēr).

One person in the story answers people **scornfully** (skōrn'fōōl lī).

An ancient ship moved by oars, with a large, square sail, was called a **galley** (gāl'ī).

When a man goes out to search for new lands or to make a fresh discovery of something, he is said to **explore** (ēks plōr').

YOUNG VIKING SAILOR *

A blow from a rough hand sent Thorfin spinning across the beach. Slowly the boy rose to his feet. Magnus, the red-bearded giant who had struck him, scowled at Thorfin, at the stout oaken galley being prepared for her voyage, and at the stone houses at the edge of the sparkling cove in Greenland.

"You're no sailor," he said scornfully. "Your place is in the fields." He shook his head. "Aye, it's mad Lief must be to start a voyage into the unknown with the likes of a farmer's boy."

"I am a sailor!" replied Thorfin hotly. "Or I will be by the time we come back!"

"If you come back," sneered Magnus. "I was a fool to come on this trip. Who knows what dangers lie ahead? Leif Ericson is like his father, Eric the Red, headstrong and proud. He will have us all killed to prove there is land across this dark sea."

"At least he will prove it," Thorfin said to himself as the huge Magnus lumbered off.

As the coast of Greenland faded from view the next day, with quick eyes the boy watched the oarsmen pull the dragon ship swiftly toward the west. Some day he would be a sailor too—a real sailor. It had been wonderful of the great Lief to take him, even though Thorfin would be mending badly torn nets the whole time. Thinking of his job brought Thorfin up with a start. He had work to do!

That night after he could no longer see well enough to work, Thorfin stood beside the high, curving prow.

"A calm night." The voice came from out of the darkness alongside him.

Thorfin peered into the half light and made out the figure of a tall man. It was the Captain!

"Aye, a calm night, sir," Thorfin replied. "The sun set red. It should be fair in the morning."

"So our boy is a sailor!" Lief's laugh seemed to sound out over the entire one-hundred-foot length of the ship. "It's all right, boy," he said, as he patted Thorfin on the back. "You will be a good sailor!"

"Thank you, sir," the boy whispered, pride making

* Adapted from a story prepared for this book by William McKellar.

his voice seem small in his throat. "If I had only the time to watch and learn!"

"You have time now," Lief said. As Thorfin listened carefully, the great Norse hero pointed to the North Star. "Yonder is the mariner's friend. When the sun does not shine it is the North Star by night that gives us our directions. Right now we are going westward."

"And what lies there, sir?" Thorfin asked eagerly.

"I do not know. But of this I am sure. There is a land there. A land that no European has ever seen before."

Thorfin nodded his head. If the mighty Leif Ericson, the first man to sail nonstop from Norway to Greenland, believed in this unknown land, that was good enough for Thorfin!

The days that followed were thrilling ones for Thorfin. First had come the excitement when they had sighted the land with forests. This probably was the land we now know as Labrador. Then a fierce gale from the north sprang up. It filled the ship's one sail and sent the little wooden boat skimming southward far away from the land that they had seen. Huge waves crashed down on them and shook the tiny ship from bow to stern.

Thorfin had not minded the storm, but oh how upset he was that day when he saw porpoises!

"Look! Look!" he shouted in fear. "There are sea serpents near the ship!"

How Magnus and the others laughed! "I said *you* would never be a sailor!" Magnus said. Thorfin's ears burned all that day.

Yet it was Thorfin, ever-watchful, who first saw the birds and the seaweed which told that again they were near land. Leif himself praised the boy. Thorfin, reddening with pride, made up his mind that he would not close his eyes until he saw land.

The hours that followed were long and trying. Thorfin tried very hard to keep awake, but at last sleep bent down his eyelids. When he awoke, it was to find the ship gliding into a pleasant cove.

"What happened?" he cried. Then he remembered. He had planned to stay awake like a good sailor, and he had failed. He knew that the water at the corners of his eyes was tears.

"Ah, Thorfin," said Leif, "you weep? And no wonder. Tears of joy should be yours, for was it not you who saw the birds and the seaweed? You are a good sailor, Thorfin. Come, I am taking you with me to explore the new land."

Magnus scowled, but the others patted Thorfin in a friendly way as he proudly moved between the rowing-benches to the great viking's side. Thorfin no longer cared what Magnus thought. It was enough to know that Leif had called him a good sailor, and that he was about to set foot onto this unknown land!

The land that five hundred years later men would call America!

COMPREHENSION QUESTIONS

Underline the right answer to each of the questions below.

1. From what country did Leif's ship sail?
a. England b. Russia c. Greenland d. France
2. Who was Leif Ericson's father?
a. Magnus b. Columbus c. Eric the Red
3. When it was night, what gave Leif Ericson the directions?
a. a compass b. a magnet c. schools of fish
d. the North Star
4. They didn't stop at the first land they saw because of:
a. fear b. a leak in the boat. c. a fierce gale
5. Thorfin mistook these animals for sea-serpents:
a. whales b. sharks c. porpoises d. seals
6. The first person to see birds and seaweeds was:
a. Leif b. Magnus c. Thorfin d. a cook
7. The country where Leif and his men landed was later to be called:
a. Alaska b. Canada c. America

DISCUSSION QUESTIONS

Write your answers to the questions below.

1. Why did Magnus hit Thorfin? _____

2. Why did Magnus think he was a fool to go on this trip?

3. Do you think Thorfin appreciated having Leif take him along? _____ What proof have you? _____

4. Was Thorfin faithful to his work? _____ What makes you think so? _____

5. Compare Thorfin with Jimmy Neal. Which one deserves more credit? _____ Why? _____



Explored Lands in Early Ages



Explored Lands in Middle Ages



Explored Lands Soon After Columbus



Explored Lands Now

You have just read a fanciful story based on Leif Ericson's trip to America. You are now about to read some real historical facts about Leif and other great explorers. This article is like the material you find in your *social studies* or *history* books. Don't try speed reading with this article. Read it slowly, so that you can understand it thoroughly and so that you can fix the facts in your mind as you go along.

1. Read the title under each map above and then study the map, itself, to find out just what parts of the earth were explored during each of the four different periods.
2. Quickly read the boldface headings to find out what important topics the selection discusses.
3. Read the text under each heading carefully, trying to find answers to these questions:
 - a. Who were some of the most famous explorers during this period?
 - b. What caused each explorer or group of explorers to take a trip?
 - c. Where did each go?
4. After you have finished reading the selection, fill the blanks on page 33.

People who lived in one of the ancient countries were called *Phoenicians* (fē nish'ānz).

There was a city in olden times which was called *Constantinople* (kōn'stān t'nō'p'l).

This city is now called *Istanbul* (is'tām bōol').

You will soon read about men's *explorations* (eks'plō rā'shūnz).

Explorers of early times made many *discoveries* (dis kŭv'ēr iz).

One explorer named in the selection is *Marco Polo* (mār'kō pō'lō).

Another one is *Cartier* (kār tyā').

Still another explorer named in the selection is *Ponce de Leon* (pōn'thā dā lā ōn').

A sea north of Africa and south of Europe is called the *Mediterranean Sea* (mēd'i tē rā'nē ān).

A narrow strip of water between Africa and Spain is called the *Strait of Gibraltar* (jī brōl'tēr).

SOME FAMOUS EXPLORERS

EARLY EXPLORERS

Even in the early days there were men who were moved by the urge to explore. They wanted to travel far away from their own countries and to find out what lay beyond.

The Phoenicians, who lived along the eastern shores of the Mediterranean Sea, were the boldest of the early explorers. They needed tin to mix with copper in making bronze swords and jewelry. They knew that England had tin. So they sailed out through

the Strait of Gibraltar into the unknown Atlantic to find a water route to England—and they did. By 1000 B.C. they were making many voyages to England by way of the Mediterranean Sea and the Atlantic Ocean.

EXPLORERS IN THE MIDDLE AGES

It was about the year 1000 when Eric the Red found ice-covered Greenland and when Leif the Lucky saw the rocky coast of Labrador and the sandy shores of Cape Cod. These brave, fair-haired vikings were not seeking trade routes or riches for their country. They traveled because they loved adventures.

Several years after Eric discovered America, Marco Polo set out from Venice to find a way to what is now China. He trudged across strange lands, hot deserts, and rugged mountains. After many years he returned with silks and precious stones. He had found China!

In about 1450 the Turks took Constantinople and would not let traders use this route to the East.

This blocking of the usual route to India and China resulted in a great new interest in exploration. Many explorers in the different European countries wanted to try their luck in finding a new route to India.

Columbus was one of these. He reasoned that the world was round, and that it would be possible to reach India by sailing West. In 1492 he set out from Spain. He reached—not India—but the New World, later to be called America.

AFTER COLUMBUS

Once the New World was discovered, England and the different countries of Europe began sending out explorers. They wanted to claim new lands.

John Cabot landed on Labrador and claimed Labrador and Newfoundland for England. Ponce de Leon discovered what is now Florida and claimed that land for Spain. De Soto explored the southwestern part of our country and also claimed this land for Spain.

Cartier and other French explorers claimed for France land along the St. Lawrence River and along the Great Lakes, and land drained by the Mississippi River. Drake claimed the whole region of what is now California for England. Hudson discovered what is now New York and explored the bay which bears his name.

RECENT EXPLORATIONS

Finally, all of the land in the New World had been explored. Interest then began to develop in the far north and the far south. This interest was mainly scientific.

Sir George Hubert Wilkins made flights over part of the Arctic and Antarctic regions in 1927 and 1928. Rear Admiral Richard Byrd made several polar flights in the years from 1920 to 1934.

Now men want to find out what is on the other planets. The next great explorers will be travellers to other planets.

ACTIVITY 1—WHO? WHAT? WHERE?

For each of the periods named at left, tell the name of an explorer or explorers, the purpose in starting, and one place that was found.

	<i>Explorers</i>	<i>Purposes</i>	<i>Discoveries</i>
Early:	1. _____	_____	_____
Middle Ages:	2. _____	_____	_____
	3. _____	_____	_____
	4. _____	_____	_____
After Columbus:	5. _____	_____	_____
	6. _____	_____	_____
	7. _____	_____	_____
	8. _____	_____	_____
Recent:	9. _____	_____	_____
	10. _____	_____	_____



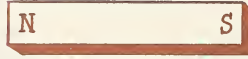
COMPASS



U-MAGNET



HORSESHOE
MAGNET



BAR MAGNET

MARINERS AND MAGNETS

Why did Leif use the stars instead of a compass? The selection below will answer this question. This selection is like the material you find in your *science* textbooks. Carefully follow the directions for reading it. Then you will know how to read similar material in your *science* books.

1. Study the pictures of the different articles. Read the name of each article and see if you can work out the pronunciation of each of these names by yourself.
2. Read all of the headings in boldface type as usual. Decide whether this is to be a problem-solving selection or a classification selection.
3. Turn back to the first heading. Make up a question which you think will be answered under the first heading, such as "What was the problem early mariners faced?"
4. Read the paragraphs under each heading carefully to find the answer to the question.
5. Continue in the same way as you read the rest of the article.

Anything that is exactly right is said to be *accurate* (ăk'û rīt).

The early Greeks called a certain stone *magnes* (măg'nēz).

EARLY MARINERS FACE A PROBLEM

For many years after men had learned to build excellent ships, they were afraid to travel very far away from home. They just skirted the shores of their country, sailing out in the morning and returning before sunset. They did this because they had no instruments that could tell them in what direction they were going.

The sun and stars were the only real guides that seamen had for many years. Leif Ericson was one of the few mariners who was bold enough to start out on a long trip with only the sun and stars to guide him.

The sun and stars told mariners the general direction in which they were sailing. But the sun and stars could not give them really accurate information. Then, too, there were many times when the sun and stars could not be seen because of fog, clouds, or storms. Long water journeys were difficult or impossible until the compass was invented.

HOW WAS THE FIRST COMPASS MADE?

For years men had known about a certain brown stone that attracts pieces of iron or steel to it. This

When reading in your science book you often find directions for carrying out an experiment. The results of the experiment answer the question or solve the problem being discussed.

You will find directions for doing experiments to answer the questions in the headings on the next page. Do these experiments if you possibly can.

In carrying out an experiment, read the directions one at a time. Carry out each one as soon as you have read it. You must read *every* word carefully, and do *exactly* what each direction tells you to do.

This stone could draw pieces of iron toward it. It had *magnetism* (măg'nē tīz'm).

An act undertaken to try out or test something is called an *experiment* (ēks pēr'i mēnt).

stone was called "lodestone." It was found in large amounts near the very old city of Magnesia in Syria. The early Greeks and Romans called the lodestone *magnes*. The word *magnetism* comes from this word *magnes*. We now know that lodestone is a kind of an iron ore.

The early people discovered that the lodestone would attract pieces of iron. They also discovered that when a piece of iron was rubbed on a lodestone, the iron would in turn pick up other pieces of iron. Later, it was discovered that a sliver of iron which had been rubbed on a lodestone would always turn in a north-south direction.

After a time, mariners began carrying a small bar of magnetized iron with them. They would place this bar in a bowl of water on top of a light piece of wood that would float. The floating bar always turned until it was in a north-south direction. Thus it helped the mariner to know which way he was going. From this crude beginning, the compass was invented. As the years have passed, men have made compasses that are much more accurate. They have also learned a great deal more about magnets and magnetism.

If a question is asked after some of the directions, take time to reason out the answer.
Now read the paragraphs under the next heading and follow the directions for the experiment.

WHERE IS A MAGNET'S FORCE STRONGEST?

In order for you to understand how a magnetic compass works, you first should perform the following experiment to learn where a magnet's force is strongest.

1. Get a bar magnet, a horseshoe magnet, a U-magnet, and some tacks.
2. Spread the tacks evenly on a table or your desk.
3. Lay the bar magnet on the tacks.
4. Lift the magnet. To what parts of the magnet do most of the tacks stick?
5. Do the same things again, using the horseshoe magnet and the U-magnet. To which parts of each of these magnets did most of the tacks stick?

If you were able to do the experiment above, you found out that most tacks stuck near the two ends of each of the magnets, regardless of its shape. This means that the force in those parts of a magnet is stronger than in other parts.

The places where the force is strongest are called the poles. Every magnet has two poles, and these poles are at the ends of the magnet. The earth itself is a huge magnet with two poles, the North Pole and the South Pole.

ACTIVITY 1—QUESTIONS AND DIRECTIONS

1. Without looking back at the article, tell exactly what you would do in carrying out an experiment to answer the question, "Where is a magnet's force strongest?"

a. _____

b. _____

c. _____

d. _____

e. _____

2. What conclusion did you reach as a result of this experiment? _____

CAN EITHER END OF A COMPASS NEEDLE POINT NORTH?

Here is another experiment for you to carry out. This experiment will help to answer the question in the boldface heading. Read each direction *very* carefully and carry it out *exactly*.

This experiment will tell you something else about how the compass works. You already know that the needle of a compass is a magnet, and that the force of a magnet is strongest at its ends. Now you need to find out whether one particular end of the compass needle always points north, or whether either end can point north.

1. Get a bar magnet marked S on one end and N on the other end. If you don't have a marked bar magnet, you can use a plain one by marking one end with chalk. You will also need a bowl with an inch or two of water in it. The final piece of equipment you will need is a block of wood just large enough to float the magnet.
2. Try floating the magnet on the block of wood in the bowl. Take out and replace the magnet three or four times.
3. Watch the magnet carefully to see if one end *always* points to one direction and if the other end *always* points to another direction.

3. Tell exactly what you did in the experiment to find out if either end of a magnet can point north.

a. _____

b. _____

c. _____

4. What conclusion did you reach as a result of this experiment? _____

FACTS AND FIGURES ABOUT EXPLORERS

On this page and the next one you will find some problems about early explorers. You have already learned that you should read *mathematics* differently from the way you read *literature*, *social studies*, or *science*.

You have had practice in using three procedures that are helpful in reading problems:

1. Reading the entire problem to get a mental picture of the scene of the problem.
2. Reading the last sentence again to make sure that you understand what you are asked or told to do.
3. Reading again the sentences that have numbers in them to find what facts are given.

Now you will have practice in using the fourth step:

4. Reading the problem again to decide what process to use.

Because you should use all of these steps in solving difficult problems, you will be asked to do all four of them below. Write your answers for the first three steps. Underline the best answer for the fourth.

PROBLEMS ABOUT EXPLORERS*

1. A compass card has 32 points of direction equally distributed over its 360 degrees. How many degrees are there between each point of direction?

A. What picture did you see? _____

B. What are you asked to find? _____

C. What facts are given you to work with? _____

D. What process should you use?

a. add b. subtract c. multiply d. divide

2. During one day of westward sailing, Leif Ericson's ship travelled 216 nautical miles. A nautical mile is 1.15 times as long as a land mile. How many land miles did Leif travel that day?

A. What picture did you see? _____

B. What are you asked to find? _____

C. What facts are given you to work with? _____

D. What process should you use?

a. add b. subtract c. multiply d. divide

3. An ancient Venetian galley discharged .825 of its 760 passengers at Constantinople (now called Istanbul). How many passengers got off at Constantinople?

A. What picture did you see? _____

B. What are you asked to find? _____

C. What facts are given you to work with? _____

D. What process should you use?

a. add b. subtract c. multiply d. divide

4. The *Santa Maria* is said to have been 128.5 feet long and to have had a beam (width) $\frac{1}{5}$ its length. If so, how wide was the *Santa Maria*?

A. What picture did you see? _____

* Based on problems prepared by F. J. Mueller.

- B. What are you asked to find? _____

- C. What facts are given you to work with? _____

- D. What process should you use?
a. add b. subtract c. multiply d. divide
5. Suppose that the carrying capacity (tonnage) of the *Santa Maria* was 103.25 tons, the *Pinta* 51.37 tons, and the *Niña* 39.68 tons. What was the total tonnage of the fleet of Columbus?
- A. What picture did you see? _____

- B. What are you asked to find? _____

- C. What facts are given you to work with? _____

- D. What process should you use?
a. add b. subtract c. multiply d. divide
6. Magellan, the first explorer to travel around the world, started out with five ships. Their carrying capacities were 121 tons, 109 tons, 90 tons, 86 tons, and 75 tons. What was their total tonnage?
- A. What picture did you see? _____

- B. What are you asked to find? _____

- C. What facts are given you to work with? _____

- D. What process should you use?
a. add b. subtract c. multiply d. divide
7. An explorer figured that his crew of men would use 8,375 gallons of water per day on a 53-day voyage. How many gallons of water must he load for this voyage?
- A. What picture did you see? _____

- B. What are you asked to find? _____

- C. What facts are given you to work with? _____

- D. What process should you use?
a. add b. subtract c. multiply d. divide
8. On his ship, the *Half Moon*, Henry Hudson's men loaded 5,644 pounds of water in several casks. Each cask held 59 pounds of water. How many casks were used?
- A. What picture did you see? _____

- B. What are you asked to find? _____

- C. What facts are given you to work with? _____

- D. What process should you use?
a. add b. subtract c. multiply d. divide
- If you have time, you may work the problems on a separate piece of paper.

Reading Problems in Your Mathematics Book

Whenever you are about to do a difficult problem read and reread it for the purposes below.

1. Read the problem to see if you can picture in your mind the scene where the problem took place.
2. Reread the last sentence to make very sure that you know what the problem asks you or tells you to do.
3. Reread the sentences that contain numbers to find what facts you are given to use in computing the problem.
4. Reread the entire problem to decide what process to use.

ADDITIONAL SOUNDS OF THE VOWELS

You have reviewed long and short vowels. You have also reviewed principles that help you to tell whether a vowel is long or short.

There are many other sounds of the vowels. Some of the most common of these other sounds will be reviewed below.

Vowels Followed by r

A. Pronounce the words below. Listen to the sound of the vowel, and answer the questions with "Yes" or "No."

1. car Does the a in these words
hard have a sound that is differ-
farm ent from either long a or
short a? _____
2. care Does the a in these words
bare have a sound that is differ-
share ent from either long a or
short a? _____
3. her Does the e in these words
serve have a sound that is differ-
stern ent from either long e or
short e? _____
4. sir Does the i in these words
bird have a sound that is differ-
third ent from either long i or
short i? _____
5. or Does the o in these words
for have a sound that is differ-
storm ent from either long o or
short o? _____
6. urn Does the u in these words
hurt have a sound that is differ-
curve ent from either long u or
short u? _____

B. Draw your conclusions. Then fill the blank space in the sentence below:

If the only sounded vowel in a word is followed by _____, the sound of the vowel is usually controlled by the _____, and the sound of the vowel is neither short nor long.

C. The sounds of vowels governed by r are marked, as follows:

- ä as in ärt
â as in câre
ê as in lâter
î as in sîr (sîr)
ô as in fôr
û as in cûr
- (the sound of i followed by r has no sound-marking of its own in words having only one vowel. In such cases it is respelled as u and marked û.)

Mark the vowels followed by r in the words below. Respell i as u if necessary.

arm	burn	maker	dare
form	bird	fur	per cent

Sounds of Double o

Double o [oo] has two sounds. The long sound of oo is the sound you hear in *school*. The short sound is the sound you hear in *foot*.

These sounds are marked as follows:

ōō as in schōōl oo as in fōōt

Write each of these words under the right heading and mark the oo in each one to show what sound it has:

cool	wood	took	food	soon
book	fool			

Long Sound

Short Sound

Sounds of oi and oy

When the vowels oi or oy come together, they have a sound of their own.

Read these words and listen to the sound of oi:

oil	soil
boil	toil

Read these words and listen to the sound of oy:

boy	joy
toy	Roy

Fill in the blank spaces below with words:

When o and i or o and y come together in a word, both letters are heard in _____ blended _____.

Both oi and oy have the _____ sound.

HOW WELL CAN YOU RECOGNIZE VOWEL SOUNDS?

Finding the Correct Vowel Sound

Here are pictures for words having one sounded vowel. See if you can tell which sound each vowel has.

Find a picture standing for a word with a vowel sound like the one stated in each of the phrases below. Write the number of the picture on the blank space opposite the phrase that tells the correct sound. In one case there are three pictures that fit one vowel sound.

1 	4 	5 	6 	7 
2 	_____ long <u>a</u> as in <i>ate</i> _____ short <u>a</u> as in <i>at</i> _____ <u>a</u> followed by <u>r</u> as in <i>car</i> _____ <u>e</u> followed by <u>r</u> as in <i>herd</i> _____ <u>i</u> followed by <u>r</u> as in <i>stir</i> _____ <u>o</u> followed by <u>r</u> as in <i>horn</i> _____ <u>u</u> followed by <u>r</u> as in <i>hurt</i>			8 
3 				9 

Applying Vowel Sounds

All the words below are in the next unit of this book. See if you can work out the pronunciation of each one.

Mark the sounded vowel in each word. Respell words in which i is followed by r. If there is a silent vowel, cross it out. Identify the sounded vowel on the line to the right of the word.

Use all of the information that you have had so far in this book about vowels. The first one is done for you.

- | | |
|--------------------------------|-----------------|
| 1. frönds _____ <i>short o</i> | 10. form _____ |
| 2. scum _____ | 11. smart _____ |
| 3. slime _____ | 12. firs _____ |
| 4. cones _____ | 13. turn _____ |
| 5. jug _____ | 14. jerk _____ |
| 6. shrub _____ | 15. fern _____ |
| 7. speck _____ | 16. peak _____ |
| 8. shirt _____ | 17. feast _____ |
| 9. coast _____ | 18. yeast _____ |

FINDING SYLLABLES IN WORDS

There is nothing that will help you more in pronouncing new words in your reading than knowing just how to divide words into syllables. At your school level you will meet many, many long words in your textbooks. The first thing to do in working out their pronunciation is to divide them into syllables. You will be given practice in doing this on page 41.

How Many Parts or Syllables Can You Hear?

Each part of a word which you can hear separately is a syllable. How many separate parts can you hear in each of the words below? The number of syllables is written for each of the first three words. You write the number for each of the other words.

get	<u>1</u>	dipper	_____	grownup	_____
happen	<u>2</u>	crack	_____	handful	_____
multiply	<u>3</u>	Columbus	_____	paragraph	_____

Counting Vowels and Syllables

Count the number of vowel sounds in each word below, then count the number of syllables. Write the numbers on the blank spaces.

	Vowels	Syllables		Vowels	Syllables
fast	_____	_____	mariner	_____	_____
compass	_____	_____	know	_____	_____
mix	_____	_____	develop	_____	_____
deck	_____	_____	problem	_____	_____

True or False?

What did you discover about vowel sounds and syllables?

Are the following sentences true?

There are as many syllables in a word as there are vowel sounds. _____

Each part of a word which has a vowel sound is a syllable. _____

Do Silent Vowels Count?

You have learned that e is usually silent when it comes at the end of a word that has only one other vowel, such as *mile* or *same*. Would you count e in such a word as making another syllable?

How about a word in which there are two vowels together, such as *boat*, *reach*? Would you count each one of these vowels as making a syllable?

Answer the questions below.

	How many vowels are silent?	How many vowels are sounded?	How many syllables are in the word?		How many vowels are silent?	How many vowels are sounded?	How many syllables are in the word?
rose	_____	_____	_____	sail	_____	_____	_____
wave	_____	_____	_____	coast	_____	_____	_____
huge	_____	_____	_____	beam	_____	_____	_____

Write the right word in the sentence below:

The only vowel that counts when you are deciding on the number of syllables is the vowel that is

_____.

DIVIDING WORDS INTO SYLLABLES

How can you tell where to divide a word when you want to break it into syllables? The work on this page will help you to answer this question.

Dividing Between Words Forming Compounds

The easiest guide for breaking words into syllables is the one that you may use with compound words. When you want to divide a compound word into syllables, you just divide between the short words that form it. For instance, campfire is divided camp fire. If there are syllables within one or more of the shorter words, you'll have more dividing to do. But you're always safe to begin by dividing between the words.

Below are some two-syllable compounds that are used in the next unit. Draw a line to divide each one into syllables. The first one is done for you.

wind/storm	raintree	goldfinch	nutshell
driveway	northwest	boldface	rainfall
uplands	songbirds	horsetail	puffball

Dividing Between Double Consonants

Another easy guide is the one that you can use when double consonants (dd, ss, and so on) come between sounded vowels. Usually you divide between the double consonants.

Divide the words below according to the guide. You know how to pronounce all of these words. You shouldn't have any trouble in dividing them.

dinner	rabbit	happy	differ
account	swimmer	bottom	cabbage
peddler	Binnie	arrange	summer

Dividing Between Separately Sounded Consonants

When two separately sounded consonants come between two sounded vowels in a word, you usually divide between the consonants. The word *person*, for instance, has two separately sounded consonants, r and s, between two sounded vowels, e and o. So you divide between the r and the s: per son. Divide the words below.

garden	oblong	surface	compose
winter	person	discuss	export
chapter	carpet	sentence	member

Dividing Before Single Consonants

When a single consonant comes between two sounded vowels in a word, you usually divide just before the consonant. In the word *design*, for instance, the single consonant s comes between the sounded vowels e and i. So you divide just before the single consonant: de sign.

There are some exceptions to this guide. But it usually holds.

hotel	divide	autumn	total
human	native	famous	water
decide	spinal	provide	climate

LEARNING SCIENCE WORDS

The words below are in *science* textbooks most widely used at your level. You are almost sure to meet these words in studying *science* during the year. In this section you will learn how to pronounce the words and what they mean.

Science Words

In dividing the words, draw a line between syllables. Make use of what you know about the sounds of the vowels and consonants.

algae

Meaning: a group of simple plants that contain green coloring matter.

Pronunciation: How many consonants between two vowels? Now you know how to divide the word. The a at the beginning has the short sound. In the second syllable the g has the soft sound because the ae in this particular word has the sound of long e. So the last syllable is pronounced as if it were spelled jē.

condense

Meaning: to make dense; to press together.

Pronunciation: Draw a line to divide the word into two syllables. The final e, of course, is silent. Both of the other vowels in the word are short.

expand

Meaning: to spread out or enlarge.

Pronunciation: Divide this word into syllables. Since there is only one vowel in each syllable, that vowel, of course, is short.

cancer

Meaning: a poisonous growth of bodily tissue.

Pronunciation: Divide the word into syllables. What sound does c usually have when it is followed by a? What sound does c usually have when it is followed by e? Pronounce the word.

explode

Meaning: to burst from force within.

Pronunciation: In this word you find a consonant and a consonant blend between two vowels. Since a blend usually counts as just one consonant, you should know just where to divide the word into syllables. The principles you learned about vowels should aid you in deciding on the sound of each vowel.

crystal

Meaning: the solid shape assumed by many minerals.

Pronunciation: Draw a line dividing the word into two syllables. Since there is just one vowel within the first syllable, you know that the y is short.

cyclone

Meaning: a very strong, circular windstorm.

Pronunciation: Since cl is a consonant blend and has just one sound, think of it as just one consonant and divide the word as if you had one consonant between two vowels. The y in the first syllable is long. Since there is a final e at the end of the second syllable, what sound would o have?

fuel

Meaning: material used to feed a fire.

Pronunciation: This word has two vowel sounds and, therefore, two syllables. It is an exception, because there is no consonant between the two vowels. Divide it into syllables. The u is long, and the e is short.

Testing Yourself on Meanings

Without looking back on what you have read, draw a line from each of these words to its definition.

condense
cancer
crystal
explode
fuel
cyclone
algae
expand

the solid shape assumed by many minerals
a strong, circular windstorm
a group of simple plants with green coloring
material used to feed fire
a poisonous growth in the body
to make dense
to burst from force within
to grow larger

WORKING WITH SOME WORDS THAT ARE NEW IN UNIT FOUR

New Words

Here are some words that you will find in Unit Four. See if you can work out the pronunciation of these words for yourself. Make use of what you have learned about the sounds of letters and about dividing words into syllables.

1. spore

Meaning: a body in flowerless plants which grows into another plant of the same kind.

Pronunciation: Since this one-syllable word ends with e, what sound does the o have? Pronounce the word.

2. annoy

Meaning: to bother.

Pronunciation: Divide this word into two syllables. You know that when o and y come together they have just one sound. Work out the pronunciation for yourself.

3. Ferro

Meaning: old name of an island now called Hierro.

Pronunciation: Divide this word into two syllables. You know the sound e has when it is followed by r. The o at the end of the word is long. Pronounce the word.

4. structure

Meaning: something having a form made up of parts.

Pronunciation: Divide the word into two syllables. There is one vowel in the first syllable.

Is it long or short? _____ There are two vowels in the second syllable. Which one

is silent? _____ The sounded vowel sounds like the u in *nature*. Pronounce the word.

5. canary

Meaning: the name of a yellow bird that comes from the Canary Islands.

Pronunciation: Divide this word into three syllables. The first syllable sounds like ká. You should have no trouble in pronouncing the other two syllables.

6. volcanic

Meaning: having to do with a volcano, which sends up hot lava.

Pronunciation: Divide the word into three syllables. The a in the middle syllable is short.

7. fungi

Meaning: simple forms of plant life without green coloring, roots, stems, or leaves.

Pronunciation: Divide the word into two syllables. You will have no trouble in pronouncing the first syllable. In pronouncing the second syllable remember that when g is followed by i,

it usually has the _____ sound. You also may have noticed that when a sounded vowel comes at the end of a one-syllable word it has the long sound, as in *he, do, cry*. The same is often true of the final syllable in a longer word.

So what sound does i have in *fungi*? _____

8. Corpus Christi

Meaning: a church festival.

Pronunciation: Follow the usual rule for dividing each of these words into two syllables. You

know that r governs the sound of _____ in the first syllable of the first word. Since there is just one vowel in the second syllable of this word and in both syllables of the second

word, each of these vowels has the _____ sound. Pronounce the words.

9. José

Meaning: the Spanish word for *Joseph*.

Pronunciation: Divide the word into two syllables. The o is long, and the e sounds like long ā. The j in Spanish sounds like our h, and s sounds like z. So we pronounce this boy's name Hō zā'.

10. Señor

Meaning: the Spanish word for *Mister*.

Pronunciation: Divide the word into two syllables. The Spanish pronunciation is sā nyōr'.

11. Rafael

Meaning: a man's name, in Spanish.

Pronunciation: Divide the word into three syllables. The Spanish pronunciation is Ráf a el'.

FINDING THE MAIN IDEAS IN PARAGRAPHS

In nearly every paragraph there is one idea that is much more important than all the others. If you can learn quickly to find this main idea in paragraphs, it will be helpful in all of your studying.

Read each of the paragraphs below. See if you can find the most important idea in each one.

Below each paragraph you will find three ideas that are expressed in the paragraph. Underline the idea that you decide is the main one in the paragraph.

- A. The weasel probably is the worst animal bandit. You can't blame a meat-eating animal for hunting his dinner, but the weasel kills more than he can eat. He follows rabbits to their underground homes and often kills their entire families. In a chicken house he may kill as many as 30 hens in a night. He is hated by animals and farmers, alike.
- The weasel kills entire families of rabbits.
 - You can't blame him for hunting his dinner.
 - The weasel is probably the worst animal bandit.
- B. David Thompson was the first white man to travel the full length of the Columbia River. He crossed the Rockies in 1807 and built Kootenay House, the first trading post on the Columbia River. In order to establish other posts he travelled up and down the river and its tributaries. He explored the Columbia River to its source in 1811 and then turned his canoe around and journeyed down to the ocean.
- David Thompson built the first trading post on the Columbia River.
 - Thompson travelled to the source of the Columbia River before going down to the ocean.
 - Thompson was the first white man to travel the full length of the Columbia River.
- C. Spiders travel in many different ways. Some of them can run very rapidly on foot. Some are expert swimmers and divers. Others can walk on the water. Other spiders can even travel great distances through the air in parachutes which they make out of their webs.
- Some spiders can travel through the air.
 - Spiders travel in many different ways.
 - Some spiders are expert swimmers and divers.
- D. One kind of fish has no eyes. These fish are small, only about four inches long. They have no scales and no bones. In place of bones they have segments of cartilage. They seem to know when anyone is coming close to them, for they swim away rapidly when a person gets near.
- One kind of fish has no eyes.
 - There is a fish that is only four inches long.
 - One kind of fish has no scales.
- E. The early people of Peru founded a powerful nation. They did this because they did many things much better than other people of that time. They dug ditches which carried water to the desert coast where farming was carried on. No other people have ever made more beautiful pottery or textiles.
- The early people of Peru built ditches.
 - The early people of Peru founded a powerful nation.
 - The early people of Peru made fine pottery.

READING FAST

You will find a short story on the next page that you may use in practicing rapid reading.

You have already learned that the secret of fast reading is to be able to take in several words with each fleeting pause of the eyes. Some marks have been placed between groups of words in the lines of print to help you to take in a wide eyeful at each glance. Fix your eyes on the first phrase and try to read that group of words at one glance. Then quickly move your eyes on to the next phrase and see if you can read that group at one glance. Continue in this way until you have read the entire story.

Before you start reading, write your beginning time in the space provided for it.

Use a watch with a second hand if you are keeping your own time. If you do not have this kind of watch, then perhaps the school clock has a second hand that you can use. If you do not have either a watch or a clock with a second hand, then do the best you can with a minute hand.

Start on an even minute such as five minutes after 10:00 or 20 minutes after 2:00. Write your starting time at the beginning of the story and your finishing time at the end.

Binnie Boe and Big Foot *

Binnie Boe // and her father // lived together
on an 80-acre farm // out in the country.

One morning // Binnie Boe was // hard at work
in the garden when, // on a tomato vine, // she found
a lucky tomato. // It had three sides // and each side
was the same // as the others. // “Look what I
found!” She pulled it // and ran // to her father.
// “Look! What does it mean?”

“It means,” // said her father, // “that a peddler,
leading a donkey // with packs // of pots and pans
on his back, // will come down // the road today.
It means // you can trade him // this lucky tomato
for something // you want very much.”

“I’ll trade it // for his dog!” // said Binnie Boe.

But her father laughed. // “Do you think that
a peddler // would give // his own dog // in a trade?”
He shook his head // and gave // the tomato back.

Finally, the peddler came. // Binnie Boe offered
to trade him // the lucky tomato // for his dog.

“Sorry, ma’am,” // the peddler said. // “I can’t trade
that dog. // He doesn’t belong // to me // like a pan.”

Hr. Min. Sec.

Ending time: _____

Beginning time: _____

Finding Your “Total Reading Time”

Subtract your beginning time from your finishing
time. Suppose you started at ten minutes after 10:00
o’clock and you finished at 12 minutes and 20 seconds
after 10:00. Then you would find your reading time
in this way:

	Hr.	Min.	Sec.
Ending time:	10	2	20
Beginning time:	10		
Total reading time:		2 min.	20 sec.

Now change the total reading time into seconds:
 $60 \times 2 = 120 + 20 = 140$ seconds.

Finding the Number of Words per Minute

There are 345 words in this story. Use the formula
below to find the number of words per minute.

No. words $\frac{345}{140} \times 60 = 143$ words per minute.
No. seconds

Use this same plan in finding the number of words
per minute *you* read, and write the number in the

* Adapted from “The Lucky Tomato Hound” by Berta
Donahue, *Story Parade*, Vol. XVIII, No. 7, September, 1953,
pp. 29–33.

“You see, // Big Foot is // like a person. // He picks
his own companions // and chooses // his own home.
It grieves me // to pass up // that lucky tomato //
of yours, // but trade Big Foot // is the one thing //
I cannot do.”

Binnie Boe gave him // the lucky tomato anyhow.
“Thank you,” // said the peddler, // and he left.

Binnie Boe’s thoughts // raced ahead // of her.
What had // the old peddler // said about Big Foot
choosing his own home? // He is // like a person.
Big Foot picks // his own companions. // Was that
what he had said?

She raced // up the driveway. // Her father stood
at the kitchen door. // “Look behind you, Binnie!”
he cried.

She looked. // There was Big Foot. // The dog
was fitting his paws // into her own footsteps.

“Big Foot!” she cried, // and she knelt // in the dust
and hugged him.

He stayed. // He stayed there // with Binnie Boe
for nine months // out of every year. // But the other
three months // he always spent // with the old peddler.

No. words 345 $\times 60 =$ _____ WPM
No. seconds

space at the end of the story. WPM means “Words
Per Minute.”

Write “Yes” or “No” After Each Question

- Binnie Boe lived in the city. _____
- The lucky tomato had three sides. _____
- Binnie thought of the idea of trading the tomato
to the peddler. _____
- Binnie’s father was doubtful that the peddler
would trade his dog for the tomato. _____
- Binnie offered to trade the tomato for some pots
and pans. _____
- Binnie Boe’s father offered the tomato to the
peddler. _____
- The peddler traded his dog for the tomato. _____
- The dog stayed always with Binnie Boe. _____
- He spent three months of each year with the
peddler. _____
- He spent nine months of each year with Binnie
Boe. _____

Comprehension score: _____ Speed: _____ WPM

UNIT FOUR

THE KINGDOM OF PLANTS



Travellers as far back as 1500 A.D. wrote about the raintree on the island of Ferro, which is one of the Canary Islands. In their accounts they said that there were no springs on the island and that rainfall was scanty. They said, however, that the natives were always able to get fresh water from their raintree.

This story might well have been true. The uplands of the island are very often covered with clouds which drop a great deal of moisture on the trees. This moisture drips to the ground in a steady stream. The natives say that the famous raintree that once provided the whole island with water was blown down in a storm. But there still are trees in the Canary Islands that "rain" in the manner just described.

The story below is an imaginary story in which the raintree has a very important part to play.

You will be so interested in the things which José and Maria did at the raintree that you'll have no trouble in reading the story fast. Time yourself as you did in reading the story on page 45. Make an effort to push your eyes rapidly over the lines, taking in as many words as possible at each pause.

Beginning time: Hr. _____ Min. _____

BLESSINGS FROM THE RAINTREE *

José saw clouds forming across the valley. "The raintree is gathering water for us," he said happily.

José and his plump little sister, Maria, lived with their parents on the island of Ferro. This small volcanic speck in the sea is the farthest west of the Canary Islands. There are no rivers or lakes in the fields and hills of black lava. Rain must be kept in stone tanks. The people were proud of their raintree. It gave them flowers in the spring and seed pods for their cattle in the fall. It gave them water when they needed it.

Every day José and Maria carried home jugs of water from the raintree. The path to it twisted past the gardens and fig trees of Señor Rafael. The Señor was a rich man who had never been friendly with his poor neighbors.

One morning they met him on the path. "My little girl is sick," he told them. "She is burning with fever and must be bathed in cool water many times a day. Will you children bring water from the raintree to my home?"

"Gladly, Señor," José answered.

* Adapted from a story prepared for this book by Olive Rambo Cook and Margaret Allison Johnson.

"Good," the Señor said. "I will leave my water-jar with you."

Up and up the steep hill the children climbed until the cloud mist felt cold upon their faces. At last they reached the huge raintree, standing all alone. Moisture dripped from its thick dark leaves and fell into a cistern, which men of long ago had carved in the hard rock. A gourd dipper lay nearby.

José set Señor Rafael's beautiful jar under the low-lying branches beside his own plain one. As he dipped water into the jars, his little pet goat, Poco, came prancing along.

"Go back, Poco!" Maria called. "You always make trouble."

"Let him come," said José. "Poco wants a drink from the raintree, too."

"What if he breaks Señor Rafael's jar?" Maria asked.

"I will watch him," José said. "Don't worry."

But, when the jars were full, Poco came up behind his master and gave him a playful butt. José stumbled. The jar slipped from his hand, and rolled down the path.

"Catch it, Maria!" shouted José. Just in time,

Maria stopped it from smashing against a huge rock.

José rushed down the path. Picking up the jar, he saw that it was cracked from top to bottom.

"I knew Poco would do something bad," Maria sobbed.

José was worried until he remembered how clever his mother was at mending broken things. There was no time to take it to her now, however, for they must hurry with the water for Señor Rafael's sick child. José had an idea. Stripping off his shirt, he tied it around the cracked jar.

"Maybe I can squeeze the crack together," he said. But, when he poured a gourdful of water into the jar, it seeped right through, wetting the cloth.

Suddenly the children heard a branch snap. "Poco is after Señor Rafael's figs!" Maria cried. "Stop him!"

More trouble, José thought as he jerked Poco away from the tree. But he stopped and stared at the fig leaves. "I knew the blessed saints would help me!" he said.

He gathered a handful of leaves. Then he put a layer of leaves over the crack on the inside of the jar. When he poured more water into it, the water pressed the leaves tightly against the jar.

"It holds!" he shouted happily. When the mended jar was again full of water, José carefully carried it to the home of Señor Rafael.

José was tempted to say nothing to the Señor about having cracked his jar, but he reminded himself that would not be honest. So he told what had happened.

"Don't worry, boy," Señor Rafael said, kindly. "Accidents will happen. I can use a smart boy like you. Will you bring water for my little girl every day until she is well?"

"Yes, Señor," José replied, "and I know my mother can mend your jar so that it will be good as new."

"Take it to her, then," Señor Rafael said, "after you bring more water from the raintree."

José carried their own large jar filled with water to the Señor's home. Then he took the cracked jar to his mother, who mended it.

The Señor paid José for carrying water every day. When his little girl was well, he and his wife invited José's family to their home for dinner.

"We must be friends as well as neighbors," the Señor said. "You see, José, sometimes accidents bring unlooked-for blessings."

Ending time: *Hr.* *Min.* *Sec.*
Beginning time: _____

No. words 762
No. seconds $\times 60 =$ _____ WPM

Find your "total reading time," and "words per minute" in the same way that you did on page 45.

COMPREHENSION QUESTIONS

- 1. Raintrees are found in:
a. Japan b. Africa c. The Canary Islands
- 2. The raintree gets its water from:
a. a spring b. clouds c. a lake
- 3. The island in the story was named:
a. Ferro b. Haiti c. Black Island
- 4. The island has:
a. rivers b. lakes c. hills of black lava
- 5. The path to the raintree passed:
a. desert b. Señor Rafael's fig trees c. pastures
- 6. Señor Rafael's attitude toward neighbors had been:
a. kind b. unfriendly c. generous
- 7. The one who was to blame for breaking the jar was:
a. Maria b. José c. Poco
- 8. José covered the crack in the jar with:
a. cabbage leaves b. fig leaves c. raintree leaves
- 9. José had the broken jar mended by:
a. Señor Rafael b. his mother c. a servant
- 10. Señor Rafael invited José's family to:
a. his fig orchard b. his garden c. his home

Comprehension score: _____ Speed: _____ WPM

DISCUSSION QUESTIONS

- 1. Would you have consented to bring water for Señor Rafael, even though he had always been unfriendly to you in the past? _____ Why? _____
- 2. If you had been José, what would you have done when you saw that the vase was cracked? _____
- 3. If you had been José, would you have told Señor Rafael that you broke the jar? _____ Why? _____
- 4. What did Señor mean when he said, "Sometimes accidents bring unlooked-for blessings?" _____
- 5. On separate paper, write a short paragraph telling how you think this story might have ended if Maria had had her way in sending Poco home.

CANARY ISLANDS



LAND WHERE THE RAINTREE GROWS

The Canary Islands are located 60 miles off the coast of northwest Africa.

You have read a story in which the raintree had an important part to play. You have also learned that the raintree grows in the Canary Islands. This article tells you more about the land where the raintree grows.

You will now read facts like those which you find in a chapter in your *social studies* books. In reading this article you will have a chance to see how well you can find the main idea in each paragraph.

1. Study the picture and read the names of the islands.
2. Glance through the first paragraph for the purpose of finding the main idea.
3. Read the three choices below the paragraph and underline the main idea which you think is correct.
4. Continue in this way until you have found and underlined the main idea in each paragraph.
5. Go back and read the entire article *carefully* to find what additional facts each paragraph tells you about its main idea.
6. You are learning a new way of studying, so don't time yourself in reading this selection.

One of the Canary Islands is named *Tenerife* (tĕn'ĕr if').

Another one is named *Fuerteventura* (fwĕr'tă vĕn tōō'ră).

A city on Tenerife is called *Santa Cruz* (săn'tă krōōz').

Tenerife also has a high mountain named *Teide Peak* (tă'dă pĕk).

THE CANARY ISLANDS *

1. The Canary Islands have belonged to Spain for more than 400 years. The islanders look very much like the people of Spain and seem to do things in very much the same way that the people of Spain do. The Spanish language is spoken everywhere in the Canaries.
 - a. The Spanish language is spoken everywhere in the Canary Islands.
 - b. The islanders look like the people of Spain.
 - c. The Canary Islands have belonged to Spain for more than 400 years.
2. The islands played a part in Columbus' discovery of the New World. Columbus sailed from Spain to the Canary Islands in 1492 on his first voyage across the Atlantic. Here he repaired his ships and loaded them with fresh food before he completed his history-making journey.
 - a. Columbus repaired his ships at the Canary Islands.
 - b. The islands played a part in Columbus' discovery of the New World.
 - c. It was in 1492 that Columbus visited the islands.
3. There are seven main islands in the Canaries, and several smaller ones. Their total area, about 2,800 square miles, is a little smaller than Delaware and Rhode Island together. The largest island is called Tenerife. Fuerteventura, the second largest, is nearest to the African coast. Grand Canary is third in area, but it has the most people.
 - a. There are seven main islands and several smaller ones in the Canaries.
 - b. The largest island is called Tenerife.
 - c. Grand Canary is third in area.
4. The Canary Islands are the tops of mountains rising from the ocean bottom. These mountains were once active volcanoes. They have not been active for more than 100 years, yet in many places steam and hot gases come from cracks or holes in

* Based upon material prepared by John Heine.

- the ground. Tenerife has the highest mountain. It is called Teide Peak, and is 12,162 feet above sea level. Some consider this mountain to be the world's highest mountain, because its height from the ocean bottom is greater than that of Mount Everest. Most land in the Canary Islands is very mountainous.
- a. The mountains were once active volcanoes.
 - b. Tenerife has the highest mountain.
 - c. The Canary Islands are the tops of mountains rising from the ocean bottom.
5. The climate on these islands is very good as a whole. In the city of Santa Cruz on Tenerife the temperature averages 72 degrees during the year, and seldom varies more than six or eight degrees above or below this average. Summer winds come chiefly from the northeast, bringing fairly cool weather. In winter, a hot southeast wind often blows from the deserts of Africa. Rainfall is light, with hardly any rain at all during the summer.
 - a. Summer winds come chiefly from the northeast.
 - b. The temperature in Santa Cruz averages 72 degrees per year.
 - c. The climate on the islands is very good as a whole.
 6. The farm products of the islands are varied, and several are important. Bananas grow well on the land and are the leading export. Sugar cane, tomatoes, potatoes, onions, and grapes are also grown. The mild climate allows crops to be planted at times so that they can be harvested when prices are high.
 - a. Bananas grow well on the islands.
 - b. Farm products of the islands are varied and several are important.
 - c. Crops on the islands can be harvested when prices are high.
 7. Many people in the islands make their living by fishing. More than 10,000 fishermen work on boats fishing along 600 miles of the African coast. They provide the islanders with an important food. Dried and canned fish are also exported.
 - a. Many people in the islands make their living by fishing.
 - b. More than 10,000 fishermen work on boats near the African coast.
 - c. Dried and canned fish are exported.
 8. Several different kinds of birds are found on the islands. Among these, the yellow songbirds are most famous. These are the same birds which families in our country keep in cages for pets. These birds came from the Canary Islands. That, of course, is why they are called "canary birds." Other birds found in the islands are the sparrowhawk, owl, and goldfinch.
 - a. The yellow songbirds are most famous.
 - b. There are several different kinds of birds on the islands.
 - c. Other birds found in the islands are the sparrowhawk, owl, and goldfinch.
 9. Among the trees that grow in the Canaries are date palms, fig, banana, and orange trees. One interesting tree is the dragon tree, which may live for 3,000 years or more. The early people of the islands called the dark red sap from this tree "dragon's blood." They rubbed it over the bodies of their kings when they died.
 - a. One interesting tree on the islands is the dragon tree.
 - b. The early people called the dark red sap "dragon's blood."
 - c. Among the trees that grow in the Canaries are date palms, fig, banana, and orange trees.
 10. The feast of Corpus Christi, about two months after Easter, is a high point in the life of the people. Designs are drawn on the pavement of the main street in several larger towns. The people gather flower petals and fill in the designs with them. This makes a carpet of brilliant color over which they march. Masses of flowers seem to grow everywhere during this season.
 - a. Designs are drawn on the pavements.
 - b. The feast of Corpus Christi is a high point in the life of the people.
 - c. The people gather flowers to fill the designs.
 11. Travellers enjoy the islands very much. The climate is pleasant and the scenery is lovely. The Canary Islanders are friendly people. In spite of their low incomes, they are always ready to invite strangers into their homes.
 - a. Canary Islanders invite tourists to their homes.
 - b. The climate is pleasant and the scenery is lovely.
 - c. Travellers enjoy the islands very much.

Studying in Your Social Studies Books

When studying in your *social studies* books you will often find several paragraphs under one heading. In such cases, study the heading carefully, then find the main idea in each paragraph. After you have done these things, go back over the material, reading each paragraph very carefully. Find out more details about the main idea, just as you did in working with this article about the Canary Islands.

TO WHAT CLASSIFICATION DOES THE RAINTREE BELONG?



Simple-Bodied
Plants



Mosses



Ferns



Seed Plants

Read the title at the top of the page. Judging from this title, do you think the information in this article is presented by the problem-solving method or the classification method?

Read the article as all classification material in *science* should be read:

1. Study the pictures and read the word or words under each group of pictures.
2. Read all of the boldface headings to find out what topic will be discussed in each of the five main parts of the article, and what smaller topics will be discussed under each of the last four larger topics.
3. Do Activity 1 on page 51.
4. Then, read the entire article carefully to find out:
 - a. How each of the main classifications differs from the the other main classifications.
 - b. How each of the smaller classifications under each main heading differs from the others.

Plants that have a very simple body are called *simple-bodied* (sīm'p'l bōd'īd) plants.

Plants which have several parts to them are said to be more *complex* (kŏm plĕks').

A plant that belongs to the same family as some other plants is said to be a *relative* (rĕl'ā tīv).

One group of plants that has one cell is the group called *bacteria* (băk tĕr'ī ā).

The green coloring matter in plants is called *chlorophyll* (klŏ'rŏ fīl).

When plants produce their own kind again and again they are said to *reproduce* (rĕ'prŏ dūs').

HOW PLANTS ARE CLASSIFIED*

There are over a quarter of a million different kinds of plants. What a hopeless task it would be to identify a single plant if the many kinds were not arranged in some orderly manner! Fortunately, plant scientists have sorted out all of the members of this large group of living things into separate groups or classes. This sorting has been done by what scientists call the "classification method."

Some scientists classify plants into five main groups. Some classify them into four main groups. The four-group classification is given in this article.

The four main groups described below are: (1) the simple-bodied plants like the pond scums, (2) the mosses and their relatives, (3) the ferns, and (4) the

seed plants. The plants in the first three groups never produce flowers or seeds. The fourth group includes those plants which we know best. Let us examine the groups separately to see how they differ.

SIMPLE-BODIED PLANTS

The simple plants of the first group have neither roots, stems, nor leaves. Most of them are very small and have a very simple body. The group is subdivided into two classes: *algae* and *fungi*.

Algae. The algae group consists of simple-bodied plants which have green coloring matter. This green coloring matter is called *chlorophyll*. Perhaps you have seen the green slime that forms along the sides of fish tanks or the green patches on the bark of trees. These are made up of thousands of tiny plants be-

* Based upon material prepared by Irving Zeichner.

longing to the algae group. The hairlike pond scums that float on still bodies of fresh water are also algae. Larger plants in this group are the *seaweeds* and *sea lettuce* that are so annoying to fishermen and swimmers.

Fungi. Those simple-bodied plants that do not have any green coloring matter or chlorophyll are called *fungi*. The fungi include over 75,000 different kinds of plants. Among these are *bacteria* and *yeasts*. A cake of yeast really is composed of millions of tiny one-celled plants without chlorophyll. The molds which you may have seen growing in colored patches on bread, fruits, and other foods are also classified as fungi. Another great group of fungi are the *mushrooms* and *puffballs*. Since they have no true roots, stems, leaves, or chlorophyll, they too are fungi.

MOSSES

The second of our main groups of plants are the green *mosses*. These plants are very simple but somewhat more complex than the simple-bodied plants described in the first classification. The mosses have rootlike and stemlike parts, but these are not considered true roots and stems because their cells contain no woody material. The mosses are called “flow-erless” plants, and they do not produce seeds.

There are two classifications of mosses: (1) the *liverworts* and (2) the *true mosses*.

Liverworts. The liverworts are flat, creeping, fleshy looking plants, with leaflike bodies. They grow best on wet rocks or logs, or on the ground in moist, shady places.

Mosses. The true mosses differ from the liverworts in that they stand upright and are very tiny in size. They, too, grow in damp places and have rootlike and stemlike parts. But these are not considered to be real roots and real stems.

FERNS

The ferns and their relatives make up the third of

the main plant groups. The ferns have true roots, stems, and leaves, but they do not have seeds. In addition to the plants known as *ferns*, the *horsetail rush* and the *club mosses* belong to this family.

Ferns. Most ferns can be recognized by their leaves, or *fronds*. On the underside of fern leaves are small brown dots that produce *spores*. These spores produce other ferns.

Horsetail Rushes. Scientists class the *horsetail rush* as a fern, although it does not look like a fern. Many of these rushes have long, stiff, rough stems with clusters of spikelike leaves quite unlike the lacy fronds of the fern. Like ferns, however, they have roots, stems, and leaves, and reproduce by spores instead of seeds.

Club Mosses. The *club mosses* are also classified as ferns because they, too, have roots, stems, and leaves, and reproduce by spores. Club mosses, however, look like little pine trees and stay green all winter.

SEED PLANTS

The seed plants are the most important of all plant groups, and more plants belong to this classification than to any other. These plants, of course, have true roots, stems, and leaves. Unlike the ferns, however, they reproduce from seeds.

There are two main groups in the seed plant family: (1) the evergreens and (2) the flowering plants.

Plants with Cones. The plants in this group do not produce flowers. Their seeds are found in cones. These plants usually have needle-shaped leaves that remain on the plant all year long. The *evergreens*, such as the pines, spruces, firs, and cedars, are members of this group.

Plants with Flowers. Plants in this group have flowers, and their flowers produce seeds. These seeds are usually found in pods, fruits, or nutshells. This group includes all *flowers*, *fruits*, *vegetables*, *grains*, *grasses*, and *weeds*. It also includes *trees* and *shrubs* that lose their leaves in autumn.

ACTIVITY 1

- Write the names of the four main classifications of plants.
 - _____
 - _____
 - _____
 - _____
- Name two smaller classifications that fall under the main classification of simple-bodied plants.
 - _____
 - _____

- Name two smaller classifications that fall under the main classification of mosses.
 - _____
 - _____
- Name three smaller classifications that come under ferns.
 - _____
 - _____
 - _____
- Name two smaller classifications that fall under the main classification of seed plants.
 - _____
 - _____

HOW BIG, HOW MANY, HOW MUCH?

On this page and the next one there are some problems about the Canary Islands and some other islands and places. Working with these problems will give you interesting information.

You have had practice in using four different steps in reading problems. In all of your work so far, possible answers have been given to the question in one or more of the steps. On these new pages no possible answers are given at all. You will need to write the answers to all of the questions, yourself.

In working with these two pages, you may also compute each problem on space provided on the page.

PROBLEMS ABOUT THE CANARY ISLANDS *

1. The average temperature of Santa Cruz is 72° . One day the temperature was 7 per cent higher than the average. How many degrees higher was it on that day?

A. What picture did you see? _____

B. What are you asked to find? _____

C. What facts are given to you? _____

D. What process should you use? _____

E. Compute the problem in the space below.

2. The land area of the Canary Islands is 2,984 square miles. The land area of Prince Edward Island is 2,184 square miles. How many more square miles are there in the Canary Islands than in Prince Edward Island?

A. What pictures did you see? _____

B. What are you asked to find? _____

C. What facts are given? _____

D. What process should you use? _____

E. Compute the problem in the space below.

3. Mount Vancouver on the Canada-Alaska boundary is 15,700 feet high. Teide Peak in the islands is 12,162 feet high when measured above the surface. What per cent of the height of Mount Vancouver is the height of Teide Peak?

A. What pictures did you see? _____

B. What are you asked to find? _____

C. What facts are given? _____

D. What process should you use? _____

E. Compute the problem in the space below.

* Based on problems prepared by Francis J. Mueller.

4. There are 820,000 people living in the Canary Islands. Of this number, 10,000 are fishermen. What per cent of the total number of people are fishermen?

A. What picture did you see? _____

B. What are you asked to find? _____

C. What facts are given? _____

D. What process should you use? _____

E. Compute the problem in the space below.

5. A Canary Island fisherman caught 725 fish in a week. On Monday of this week he caught 116 fish. What per cent of his weekly total did he catch on this one day?

A. What picture did you see? _____

B. What are you asked to find? _____

C. What facts are given? _____

D. What process should you use? _____

E. Compute the problem in the space below.

6. A certain raintree drips 12 gallons of water in a day. It loses 25 per cent of this amount through evaporation. How many gallons does it lose through evaporation?

A. What picture did you see? _____

B. What are you asked to find? _____

C. What facts are given? _____

D. What process should you use? _____

E. Compute the problem in the space below.

7. In September, which is the rainiest month in Prince Edward Island, the rainfall was 4.12 inches. The rainfall in that province for the entire year was 31.86 inches. What per cent of the year's rain fell in September?

A. What picture did you see? _____

B. What are you asked to find? _____

C. What facts are given? _____

D. What process should you use? _____

E. Compute the problem in the space below.

Reading Problems in Your Mathematics Book

Do you have trouble with problems in your *mathematics* book? If so, read and reread each problem. Make use of the four steps that you have been using in studying the problems on the Canary Islands.

WORKING WITH COMPOUND WORDS

Mastery of the abilities needed in pronouncing new words correctly and in understanding their meanings is of basic importance in studying high school textbooks.

The methods which you previously have been taught to use in working out pronunciations are: sounding letters or word elements; getting the word from context; using structural analysis (breaking the word into parts—root, prefix, suffix); and using the dictionary. All of these techniques will be reviewed in this book.

Meaning, of course, should never be isolated from pronunciation. The sounding out of a word should always be accompanied by checking its meaning in context. The use of context clues in pronunciation, analysis of word structure, and the dictionary all serve to provide both pronunciation and meanings, and that is how it should be.

In the review on this page you will work with the word structure technique in which you divide compound words into two separate words each. Then you will see if you can get the meaning of the compound word as a whole by studying the meanings of the two separate words which it contains.

The compound words below appear in Unit Five. Draw a line between the two separate words in each of these words, and see if you can write a definition for each one of them. A definition for each of the first two words has been done for you.

soapsuds: suds made with soap.

throughway: a road that goes a long distance with only a few exits and entrances.

1. byways: _____
2. trailways: _____
3. waterways: _____
4. railways: _____
5. airways: _____
6. skyways: _____
7. spaceways: _____
8. motorcycle: _____
9. warehouse: _____
10. stagecoach: _____
11. packhorse: _____
12. seaboard: _____
13. thunderstruck: _____
14. teakettle: _____
15. railroad: _____
16. inland: _____
17. flatboat: _____
18. horseback: _____

MORE ABOUT DIVIDING WORDS INTO SYLLABLES

Reviewing Guides You Have Had

Divide the words in each group below in accordance with the guide that appears above the group.

Guide 1: Dividing Between Words Forming Compounds

drugstore	underline	limestone	textbook
appleseed	watermelon	salesman	stronghold

Guide 2: Dividing Between Double Consonants

message	summon	correct	effort
narrow	passage	raccoon	command

Guide 3: Dividing Between Separately Sounded Consonants

carbon	fertile	sandal	border
contain	margin	engine	mixture

Guide 4: Dividing Before Single Consonants

student	vital	decay	select
humus	baboon	stupid	title

New Guides

Guide 5: Considering Consonant Blends and Speech Sounds As Single Consonants

Since a consonant blend or speech sound makes just *one* sound, you usually treat a blend or speech sound as if it were a single consonant in dividing words.

Use Guide 3 when dividing between a single consonant and a blend or speech sound: cen tral.

Use Guide 4 when a consonant blend or speech sound appears alone between two sounded vowels: fa ther.

Divide the words below according to Guide 5.

machine	control	Nathan	degree
library	program	author	Champlain

Guide 6: Dividing Between Prefixes, Root Words, and Suffixes

Words are formed by combining prefixes, root words, and suffixes. Since each of these parts is a syllable or combination of syllables in itself, you may divide between them when breaking words into syllables. *Unfriendly*, for instance, is made up of a prefix, a root, and a suffix, so it is divided thus: un friend ly.

Try dividing the words below:

refund	harmless	western	unfold
statement	mistake	faithful	goodness

Exception: When words end in le, ble, cle, dle, and like formations, each of these is considered a syllable in itself, even though the final e is silent. The word *vehicle* is divided ve hi cle in spite of the silent e at the end.

Divide these words:

circle	gentle	cable	rumble
--------	--------	-------	--------

APPLYING ALL YOUR AIDS TO PRONUNCIATION

On this page you will have more practice in working out the pronunciation of new words by yourself. The words with which you will work are words that you will meet in reading Unit Five.

In order to find out if you can really make use of what you know about vowel sounds and the hard and soft sounds of g and c, you will be asked to mark the sounds of the vowels as you decide upon them in each word. If there are exceptions, you will be told about them.

After you have marked each word and decided upon its pronunciation, read the meaning of the word and see if the pronunciation you gave to it fits in with its meaning.

Here is a table showing the mark used for each of the different sounds that you have worked with in this book:

<i>Long Vowels</i>	<i>Short Vowels</i>	<i>Vowels Governed</i>
āte	ăt	by <u>r</u>
hē	sět	cāre
īce	hīt	latēr
ōld	nőt	fīr (fūr)
ūse	űs	fôr
cry (krī)	crystal (krīs'tal)	hұrt
schoōl	fōot	fārm

Try working out and marking the sounds of the vowels in the one-syllable words below. Cross out silent letters. The first word has been marked for you.

- | | |
|---|---|
| <p>1. gēar: a toothed wheel that will change rate or direction in a machine.</p> <p>2. sledge (short <u>e</u>, silent <u>e</u>): a vehicle with runners to travel over ice or snow.</p> <p>3. scheme: a plan.</p> | <p>4. shaft: a long bar.</p> <p>5. source (long <u>o</u>): the beginning or cause of something.</p> <p>6. stave: a narrow strip of wood used in making the sides of a barrel.</p> |
|---|---|

Now try doing the same thing with two-syllable words. Divide each word into syllables and decide upon the vowel sound in each syllable in the same way that you would decide upon its sound if it were a separate word. The first word is marked for you.

- | | |
|---|---|
| <p>1. ĩg nīte: to set on fire.</p> <p>2. member: a part of a whole.</p> <p>3. jostle (<u>t</u> is silent): to push or crowd.</p> <p>4. schooner: a vessel having two or more masts.</p> <p>5. clumsy: awkward, not graceful.</p> | <p>6. Diesel (the <u>i</u> is silent and the first <u>e</u> is long): name of the man who invented the diesel engine.</p> <p>7. carriage (<u>i</u> is short and the second <u>a</u> is silent): a vehicle used to carry people.</p> |
|---|---|

In dividing a three-syllable word, first divide it into two syllables. Since most of the words below have been chosen to acquaint you with the common exceptions to the guide for dividing between root words and suffixes, next look to see whether there are one or two consonants between the second vowel and the third vowel.

Example: im por tant

Divide these words into three syllables and mark the vowels to show their sounds:

- | | |
|---|--|
| <p>1. expensive (short <u>i</u>): costly.</p> <p>2. settlement: a place where people settle down to live.</p> <p>3. wilderness: a wild, unsettled piece of land.</p> | <p>4. continent: a very large mass of land.</p> <p>5. passenger: a traveller in a vehicle.</p> <p>6. contraption (<u>tion</u> sounds like <u>shūn</u>): a new device or gadget.</p> |
|---|--|

WORKING WITH SCIENCE WORDS

The words below are in widely used *science* textbooks at your level. You are very apt to find all of them in the *science* book that you are using for a text, as well as in other *science* books that you are using for references.

You have been marking words, yourself. These words are marked for you. See if you can work out the pronunciation of each one by studying the marks above the vowels.

In working with these words you will find a syllable division that has not yet been discussed in this book. Often *science* words end in two vowels, the last of which is a, as in *bac ter i a* (băk tēr'ī ā). In such cases, the a is pronounced as a separate syllable. But the a has a sound different from the long a or the short a. This a sounds like a soft, short u. *Webster's Dictionary* indicates this special sound by putting the a in italic type with a dot above it: *ā*.

Each of the other vowels also has this sound. To indicate it, the dictionary prints the other vowels in *italics* with the curve above them, as in *infānt*, *silēnt*, *April*, *cōnnect*, and *circūs*.

A new sound of o is the sound that this vowel has in *sōft* or *dōg*.

Look for these new sounds in the words below.

Work through the words and phrases in the left hand column first, then fill the blanks at the right.

Decide how to pronounce each of the words below, and read the meaning of each word carefully. If you don't remember the sounds of some of the letters, look at the key words and markings at the bottom of the page.

acid ă'sīd	A class of substances which are sour in taste and which will turn blue litmus paper red.
alcohol ăl'kô hôl	A colorless liquid which burns. It is produced by fermenting certain grains, fruits, and vegetables.
alfalfa ăl fal'fā	A kind of hay used for feeding cattle.
ammonia ă mō'nī ā	A colorless gas with a sharp odor. When combined with water it is called <i>spirits of ammonia</i> .
aneroid ăn'ēr oid	An aneroid barometer is one with no liquid in it.
ascorbic ă skôr'bīk	The name of an acid, also called Vitamin C, found in orange juice, tomato juice, and so forth.
calcium kăl'sī ūm	A chemical element. Limestone and chalk are compounds of calcium.
calorie kăl'ô rī	The amount of heat needed to raise the temperature of one gram of water one degree centigrade. We use calories in measuring units of energy in food.
digestion dī jēs'chŭn	Changing food in the stomach so it can be taken into the blood.
evaporate ê văp'ô răt	Changing a liquid to a vapor.

Choose one of the words in the column at the left to complete the meaning of each of the sentences below. Write the word in the blank space where you think it belongs. Add s if necessary.

- The woman wanted to reduce her weight. She decided she should not eat so many _____.
- The farmer fed _____ to his cows.
- If the sun shines on a dish of water for a time, the water will _____.
- Vinegar is sour, and it will turn vegetable blues, such as litmus, red. Vinegar is an _____.
- Mr. Brown had a barometer with no liquid in it. It was an _____ barometer.
- Nancy needed more Vitamin C. She drank lots of orange juice because it contains _____ acid.
- Mr. Thomas burned a colorless liquid in a small burner. This liquid was not gasoline nor kerosene. It was _____.
- Jim's stomach gave him no trouble at any time. His doctor said Jim's _____ was excellent.
- The cleaning woman used a colorless liquid with a sharp odor to scrub the floor. The liquid was spirits of _____.
- Dick was surprised to know that chalk contains _____.

âte, ât, câre, ârt, pâth, vâcation, âbound, infānt; bē, mēt, hēr, hēre, ênough, silēnt; îce, ît, Aprîl; ôld, nôt, ôr, ôbey, sōft, cōnnect, fōod, fōot; cûbe, cût, bûrn, menü (French), ûnite, circūs.

FINDING THE MAIN IDEA IN A PARAGRAPH

You did some work on page 44 and again on pages 48 and 49 in which you found the main idea in each of several paragraphs. In all of these paragraphs, the main idea was in the first sentence of the paragraph.

More often than not the main idea is found in the first sentence of a paragraph. But this is not always true. Sometimes the most important thought comes at the very end of a paragraph. Sometimes it comes in the middle of a paragraph. In fact, the main idea may be in any part of a paragraph. So, in finding it you have to think about *all* of the sentences and decide which one really does give the most important idea in the entire paragraph.

There are some paragraphs below for you to read. You won't find the main idea in the first sentence of most of these paragraphs.

Read all of the sentences in each of the paragraphs. Then decide which one is really most important. Check that one in the list of sentences beneath the paragraph.

- A. The yak is an animal about the size of a small ox. It lives in Tibet. The natives use the yak to carry packs and full loads. They drink its milk, eat its meat for food, and weave its fur into cloth. The yak is by far the most useful animal in Tibet.
- a. The yak is an animal about the size of a small ox.
 - b. It lives in Tibet.
 - c. The yak is by far the most useful animal in Tibet.
- B. Do you know where the word *alphabet* came from? The Greeks coined this word. *Alphabet* came from the two Greek words *alpha* and *beta*. These were combined to make *alphabet*. Finally the word was shortened to *alphabet*.
- a. Do you know where the word *alphabet* comes from?
 - b. *Alphabet* comes from the two Greek words *alpha* and *beta*.
 - c. The Greeks coined this word.
- C. The musk deer is a small animal that lives in India. It is only about 20 inches high. The one thing that makes the musk deer famous is that he carries perfume with him. There is a gland on the underside of his abdomen. Men get musk from this gland, and musk is used widely in making perfume.
- a. The musk deer is a small animal that lives in India.
 - b. It is only about 20 inches high.
 - c. The one thing that makes the musk deer famous is that he carries perfume with him.
- D. Do you ever wonder how fish can be comfortable in cold water? The temperature of the blood of most fish is just a little above the average temperature of the water in which they live. A few fish have a blood temperature as high as 15 degrees
- above the temperature of the water in which they swim. But the fish with the warmest blood have a temperature much lower than that of human beings. All fish are cold-blooded animals.
- a. Do you ever wonder how fish can be comfortable in cold water?
 - b. A few fish have a blood temperature as high as 15 degrees above the temperature of the water in which they swim.
 - c. All fish are cold-blooded animals.
- E. The raccoon likes to have his food clean. He washes it in water before eating it. The raccoon is an animal about the size of a badger with coarse greyish-black hair. It has a bushy tail with black and white rings. Some Indians like to eat raccoons.
- a. Some Indians eat raccoons.
 - b. The raccoon is an animal about the size of a badger with coarse greyish-black hair.
 - c. The raccoon likes to have his food clean.
- F. Many boys and girls of pioneer days crossed our western plains in prairie schooners. It took three months to make the trip then. Some of these same boys and girls lived to take the trip in an airplane which crossed the country in 15 hours. So many striking changes have never taken place in the life of any other generation.
- a. Many boys and girls crossed our western plains in prairie schooners.
 - b. It took three months to make the trip then.
 - c. So many striking changes have never taken place in the life of any other generation.
- G. The most interesting thing about sandhill cranes is their dancing. Early in the spring the males gather in one place and dance. They leap and hop about and bow their heads. They also utter low cries while dancing.
- a. The most interesting thing about sandhill cranes is their dancing.
 - b. They leap and hop about and bow their heads.
 - c. They also utter low cries while dancing.

HOW TO READ FAST

You were given some helps in learning to read fast on pages 28–29 and 45. You will be given some additional helps on this page.

You have learned that the real secret of fast reading is to take in as many words as you can at each swift glance. You will be given some practice in doing this with the help of lines to guide you.

Read down each of these columns as quickly as you can, keeping your eyes right on the line from top to bottom. Don't move your eyes to the left or right at all. Try to see and read all words on both sides of the line with your eyes fixed on the line.

Blue Flowers °

This story	The people	The village people	Sometimes the sun
is about	in the village	thought that	would be bright
a village	thought that	Hilda made the rain.	and all the birds
at the foot	a beautiful princess	When it rained	would sing merrily.
of a mountain.	had her home	they would say	Then the good people
The mountain	on the mountain.	"Hilda has upset	would smile and say,
was covered	This beautiful princess	her water pot."	"Hilda must be happy."
with snow	was called Hilda.	When it snowed	When clouds rolled up
in winter.	Hilda was supposed	they would say	in the summer sky
In spring,	to have charge	"Hilda is plucking	the children would cry,
with flowers.	of the weather.	feathers from her geese."	"Soapsuds! Hilda is washing!"

Time yourself to see how fast you can read when you take in a long phrase at each quick pause.

The First Club in Canada

Beginning Time: Hr. ____ Min. ____

When the first settlers came to our land from Europe, they found it difficult to survive the long, hard winters. Many of the men developed scurvy, a disease which results from the lack of fresh food. The cabins were small, and there was too little for the men to do during the winter months. As a result they soon began to argue and quarrel.

When the great French explorer Champlain began the settlement at Port Royal he decided to do something about it. For the leaders of the colony he founded a club, *L'Ordre du Bon Temps*, which is usually translated the Order of Good Cheer.

Champlain's plan was a simple one. Each man took his turn in being chief steward for a day. It was his responsibility to plan for three meals, with a formal dinner at night. These banquets were followed by songs and musical entertainment.

The settlers soon became enthusiastic. Hunts were arranged with a reward for the most successful hunter. The members competed for the honor of providing the best meals. Often a man became so anxious to have better food than the last steward that he began his preparations two or three days in advance.

Every evening, the master for the day led a colorful procession from the kitchen to the dining room. At

the head of the line marched the chief steward, with the gold collar of the order about his neck, a napkin over his shoulder, and the staff of office in his hand. The other members followed him, bearing platters and bowls, from which floated delicious odours. Desserts, which were also elaborate, were introduced with a similar ceremony. When the dinner was over and grace was said, the steward placed the gold collar round the neck of his successor, and each drank a toast to the other.

We know a great deal about this club, because one of the settlers, Lescarbot, left a very detailed account in his diary. He declared that the food was better than that to be had in the best cookshops in Paris. The platters often held roasts of caribou, moose, beaver, otter, bear, rabbits, porcupine, and wild cats. Sometimes they would be heavy with trout, cod, or salmon, caught through the ice with a spear.

These festivities were even more successful than Champlain had hoped. He declared the club did more to keep the men healthy than any medicine.

The government of Nova Scotia has revived the Order of Good Cheer. It now has several thousand members, and its leading official, the Grand Master, is the Governor General of Canada.

Hr. Min. Sec.

Ending time: ____ ____ ____

Beginning time: ____ ____ ____

No. words $\frac{429}{\text{No. seconds}} \times 60 = \text{____ WPM}$

Find the number of words per minute which you read in the same way as you did on page 45.

* Adapted from "Blue Flowers" by Anne Stuart, *Children's Playmate Magazine*, Vol. 22, No. 21, June 1950, p. 2.

UNIT FIVE

WHEELS AND WINGS

The story below is a true story. It is about an invention that two boys made in France.

The principles that you have learned to use in pronouncing English words do not apply to French words. So you will be given help with the French words in this story.

The French word for "Mister" is *Monsieur* (mẽ syû').

Niepcé (nyẽps) is a family name.

Versailles (vẽr sî') is a city in France.

Chalons (shã lôn') is a town in France.

Read just as fast as you can, taking in several words at each glance. See if you can read this story faster than you read the story about the raintree. Be sure to jot down your beginning and ending time. Compare your score with the score you recorded on page 47.

JEAN'S LITTLE HOBBY *

Beginning time: Hr. _____ Min. _____

Monsieur Niepcé was a patient man and a good father, but this was too much!

He stood in the doorway of his country home and looked at the floor of the porch, now covered with crates, nails, and iron hoops. Even the garden with its beautiful flower beds looked like a junkyard. Shaking his head sadly, Monsieur Niepcé went into the house to find his sons.

"Claude! Jean!" he thundered. "Come here this instant!"

A few moments later two dark-eyed boys stood before their angry father. "What is it, Father?"

"Now see here, Claude, and you, too, Jean. I do not mind at all if you want to invent a horseless two-wheeled cart. But when you ruin my rose bushes with iron hoops, and I find barrel staves all over the porch, then you must be sent to the attic! Clear up this mess at once."

"But, Father," Jean, the older boy, said, "the attic is hot and dirty."

"I am sorry, my son, but a member of the King's court cannot live in a junkyard."

Only a few years before, Monsieur Niepcé had taken his sons on a journey to England. On a stained-glass window in an old English church they had seen a picture of a figure riding a two-wheeled contraption, quite unlike anything they had ever seen before. No horse pulled the machine; it was moved by the rider's feet pushing against the ground.

Jean and Claude were delighted with the idea. And, although the boys were only seven and nine at the time, no sooner had they returned home than they tried to build a machine like that on the church window. They would have nailed wheels to everything in the house if their father had allowed them. And through the years they kept on trying to make a machine that would not have to be pulled by an animal.

At the time that they were sent to the attic, the boys were in their early teens, and their father thought it was time they turned their efforts toward something more useful. The best way, he decided, would be to discourage once and for all their idea of inventing a machine. So, one day Jean and Claude were summoned by their father to the King's palace at Versailles.

Crowds of people stood about, and on a platform sat the King and Queen with Monsieur Niepcé and other members of the court behind them.

* F. J. Jupo, "Jean's Little Hobby," *Story Parade*, March 1949, p. 24. Copyright, 1949, by Story Parade, Inc. Reprinted and adapted by permission.

All of a sudden the boys heard a rumbling, and around a far corner of the palace rolled a strange and clumsy vehicle. It was a four-wheeled carriage without horses, steered by a man in front and moved by another man, huffing and puffing, who stood in back on two levers which he pushed up and down with his feet.

That evening Monsieur Niepce sat talking with his sons in the royal gardens.

"Well," he said with a twinkle in his eye, "I hope this machine has shown that you will be just a little too late with your invention."

"But, Father, that model is far from perfect," said Jean. "After all, it took two men to drive it, and one of them was so tired afterward that he had to be carried away. No, I would say that there is still quite a bit of work to be done."

Monsieur Niepce had to admit that his son was right. And Jean continued to go up to the attic to tinker with his machine even after he was grown. Then success came at last.

Hr. Min. Sec.

Ending time: _____

Beginning time: _____

COMPREHENSION QUESTIONS

Write answers to these questions:

- 1. What position did Monsieur Niepce hold? _____
- 2. Why did he send his sons to the attic? _____
- 3. Why did the boys protest against going to the attic? _____
- 4. What country had the boys visited? _____
- 5. What had they seen in a stained-glass window? _____
- 6. What did the boys try to do when they returned home? _____
- 7. What did Monsieur Niepce finally do to discourage the boys from working on their invention? _____
- 8. Why didn't the father's plan discourage the boys? _____

It was a day in spring in the year 1816. It was the first warm day and gentlemen and ladies were out walking in the parks. Children were playing and veterans of the last war were sitting on benches warming their stiff limbs in the sun. Monsieur Niepce, himself, sat on a bench.

Suddenly a cloud of dust rose in the distance, drawing nearer and nearer. People shouted, dogs began to bark, and a mounted policeman galloped up. He stopped his horse just in time.

In the middle of the dust cloud, sitting on a two-wheeled machine, Monsieur Niepce recognized his son. Jean had succeeded at last in building the first bicycle!

Jean became famous as a scientist, for he was the real inventor of photography. But often he would go up to the little attic of his father's house in Chalons to look at the contraptions he had built as a child. For he was very proud that in France, England, and America riding on a "Dandyhorse," as the bicycle was then called, had become a favorite sport.

No. words 773 $\times 60 =$ _____ WPM
No. seconds

- 9. When did the father finally realize that Jean had invented a successful bicycle? _____
- 10. For what other invention is Jean famous? _____

Allow yourself a score of 10 for each correct answer.

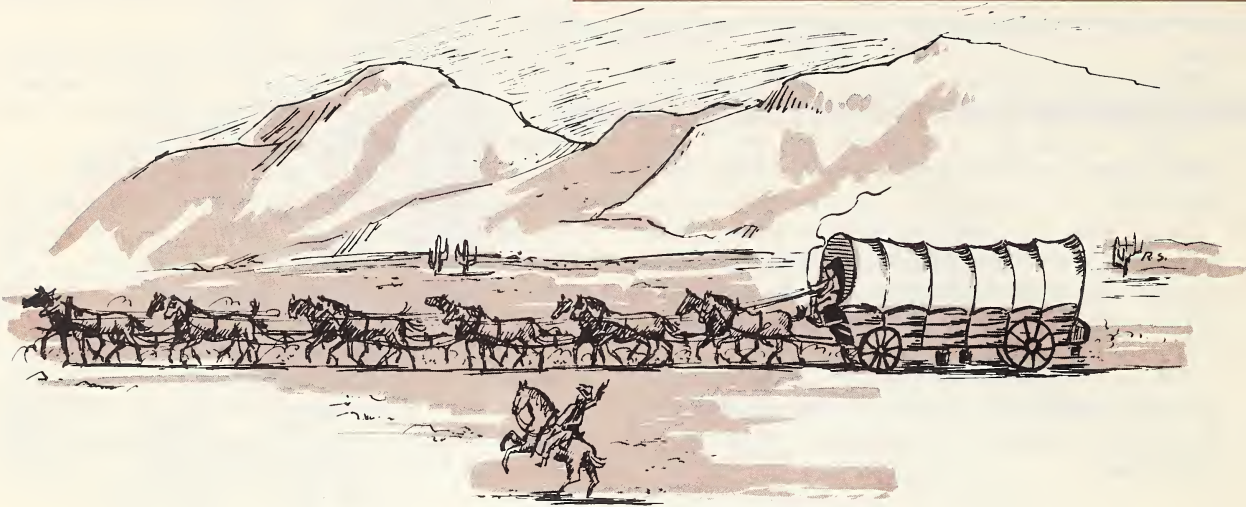
Comprehension score: _____ Speed: _____ WPM

DISCUSSION QUESTIONS

Write your answers on a separate piece of paper.

- 1. Do you think Monsieur Niepce should have been angry? Why?
- 2. Do you think his decision to send the boys to the attic was too severe? Why?
- 3. What is a "stained-glass window"?
- 4. Where have you seen stained-glass windows?
- 5. What was Monsieur's real reason for taking the boys to the King's palace to see the new vehicle?
- 6. Do you think he was justified in trying to discourage the boys from working on their machine? Why?
- 7. Jean invented the bicycle and photography. Of which invention do you think he was more proud? Why?

HOW THEY TRAVELLED THEN AND NOW



You have just read how Jean and Claude Niepce invented the first bicycle. All of the vehicles in which we ride today came as the result of men's ideas for improving transportation and their long hours of faithful work. Read the article below to find major events in the history of transportation.

1. Read each paragraph carefully and then underline the sentence below the paragraph that sums up the most important idea. In nearly all of these paragraphs, the main idea is not in the first sentence. You will need to think about all of the sentences in order to decide which one really is most important.

2. After you have underlined the most important sentence in each paragraph, go back and reread the sentences you have underlined, thinking of each one as an important step forward in transportation. Try to remember the steps in order, by thinking how each one was a little in advance of the one before it.

After rereading and trying to remember the order of the main ideas, do Activity 1.

PROGRESS IN TRANSPORTATION

1. Automobiles and trains, airplanes and ocean liners are on the move, day and night around the clock. But this has not always been so. There was a time in which man had no vehicles and no roads. The Stone Age people used streams and lakes as roadways. And they travelled on logs, one alone, or several tied together. Logs were the first vehicles of transportation.
 - a. The Stone Age people used streams and lakes as roadways.
 - b. They travelled on logs.
 - c. Logs were the first vehicles of transportation.
2. After a while man began to use animals to pull goods along over the ground. Heavy loads were dragged on sledges. Then someone thought of putting rollers under the sledges. This led to the use of the wheel. The invention of the wheel was the most important step in the history of transportation.
 - a. Man began to use animals to pull goods.
 - b. The invention of the wheel was the most important step in the history of transportation.
 - c. Heavy loads were dragged on sledges.
3. Finally the stagecoach came into use. Several people could ride in one coach. The stagecoach got its name from the fact that it travelled by stages, stopping to change horses at taverns along the way. The narrow trails that the coaches travelled over were very poor roads. Often a coach got stuck in the mud. Then the passengers would get out and push with their shoulders to help in getting it on its way again. The stagecoach was slow and tiresome. In spite of these drawbacks, stagecoaches marked a long forward step in transportation.
 - a. The stagecoach got its name by travelling in stages.
 - b. The stagecoach was slow and tiresome.
 - c. Stagecoaches marked a long step forward in transportation.

4. At last private companies began to build better roads. These were a great help to transportation, but they were expensive. The companies had to hire men to do the work, and they had to spend money for machinery and materials. The companies paid all of this expense, but the people who travelled over the roads had to pay a toll charge. The roads were blocked at places with a pole which had "pikes" or pointed pieces of wood nailed on it from top to bottom. After a traveller paid his toll, the pole was turned by the guard so that the traveller could pass on. This is why the early roads were called *turnpikes*.
 - a. At last private companies were organized to build better roads.
 - b. The roads were blocked at places with a pole which had pikes on it.
 - c. After a traveller paid his toll, the pole was turned.
5. As more and more settlements sprang up in the West, more roads were built. People in the West needed goods from the East. People in the East needed farm products from the West. In order to meet the needs of a growing country, the Conestoga wagons came into use. These wagons had white canvas tops and were sometimes called "prairie schooners." Often they were loaded so heavily that they had to be pulled by twelve horses.
 - a. As more settlements sprang up, more roads were built.
 - b. In order to meet the needs of a growing country, the Conestoga wagon came into use.
 - c. These wagons had white canvas tops.
6. Even though more and better roads were opened, travel was always slow. People and goods could move no faster than horses could pull them. Then the steamboat and railway locomotive came into use. By 1830 trips by steamboat were being made from Quebec to Montreal in a single night. In 1831 the first railway locomotive, going 20 miles per hour, pulled a train 16 miles from La Prairie to St. John on the Richelieu River. The steam engine was the first thing that really speeded up transportation.
 - a. Even though many and better roads were opened, travel was always slow.
 - b. In 1832 steamboats were being used between Quebec and Montreal.
 - c. The steam engine was the first thing that really speeded up transportation.
7. Then the "horseless carriage" was invented. More and more people began to travel by automobile. Huge trucks began carrying goods from town to town and across the country. Good roads became more important than ever. Highways and thoroughways were built. The automobile has now replaced the horse and has made land transportation faster and easier.
 - a. Huge trucks began carrying goods from town to town and across the country.
 - b. Good roads became more important than ever.
 - c. The automobile has now replaced the horse and has made transportation faster and easier.
8. But today we no longer depend on roads, railroads, and waterways alone as routes of travel. Air travel is the newest and fastest means of transportation. Airplanes now take only a few hours to reach places that are days away by train and ocean liner. Helicopters may soon replace the automobile for short distance travel. Atom-powered rockets may take mail and people from continent to continent in minutes. Rockets may even carry us to distant planets.
 - a. We no longer depend on roads, railroads, and waterways.
 - b. Air travel is the newest and fastest means of transportation.
 - c. Rockets may even carry us to distant planets.

Transportation has come a long way since man took his first step on a floating log.

ACTIVITY 1

In one or two words write the steps in the history of transportation in the order in which they were presented.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

Applying What You Learned About Studying in Your Social Study Books

In studying *social studies* material it is helpful to read through the entire selection for main ideas before studying it carefully.

If the selection discusses several events, each main idea usually deals with one of the events. Note how each main idea or event leads up to the next one. Then try to list these ideas or events in order. This will help you to remember the important points in the article as a whole.

You have read about the progress that has been made in transportation. Better roads and better vehicles helped transportation to move forward.

The work of scientists with different kinds of energy was equally important. Transportation was not speeded up much until scientists found forces more powerful than horses to move vehicles.

The article below gives you information about these forces. It is similar to the content of certain parts of your *science* textbooks.

The content in this article, however, is different from the content in any *science* articles that you have had in this book, and you will need to read it differently.

You have had help in reading science material of the problem-solving type. You have also had practice in reading material of the classification type. The content of this article is neither of these.

This article gives you information about the different kinds of energy and how they work. It is packed with *facts* and *explanations*.

Read the boldface headings first to get a preview. Then read the article carefully. You will need to read the sentences one at a time and make very sure that you understand each one. You will be told how to read each part of the article as you come to it.

A drawing that explains something is a *diagram* (dǐ'ǎ grām).

A part of an engine in which a piston is forced to work by pressure is a *cylinder* (sǐl'ín dē'r).

To fasten two things together is to *connect* (kō nèkt') them.

To make plain or clear to the mind is to make an *explanation* (ěks'plā nā'shǔn).

That which has to do with electricity is *electrical* (è lēk'trī kǎl).

That which has to do with chemistry is *chemical* (kěm'ī kǎl).

That which has to do with machinery is *mechanical* (mē kǎn'ī kǎl).

That which has to do with atoms is *atomic* (ǎ tōm'īk).

In the first part of the article there are many ideas of equal importance. Read this part to find out what the different forms of energy are. Try to impress each of the different kinds on your mind as you read about it. When you have finished reading this part, look away from the page and see if you can tell yourself what the six different kinds of energy are.

DIFFERENT KINDS OF ENERGY

Many different forms of energy have been discovered. Think of all the forces besides animal power that can do work for us. Electrical energy is the first one that comes to mind, because we use it so often around the house. Chemical energy is a much-used power also. It makes the electricity in the storage cells that in turn start motors. You may have passed through doors opened ahead of you by light energy.

Sound is classified as a form of energy, also.

Perhaps the most important form of energy in transportation is heat. Heat changed into mechanical energy makes it possible for cars, buses, trains, trucks, ships, and planes to move from place to place. In the future probably many vehicles will obtain their power from the heat of atomic energy. The machine that is used to change different forms of energy into mechanical energy for moving things is a motor or an engine.

The next paragraph explains just what happens when a person starts to move an automobile. In order to understand this explanation, do these things:

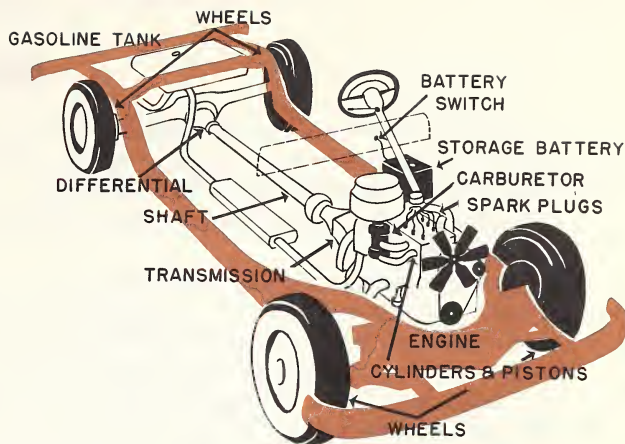
1. Study the diagram. Read the names of all of the parts that have names under them. Then try to name the parts without reading the names.

2. Read the paragraph one sentence at a time. After you read each sentence, look at the diagram, find the parts of the car that are mentioned, and try to understand just what happens as described in the sentence.

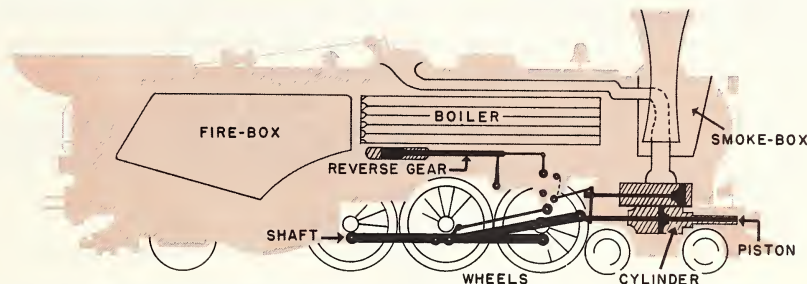
3. When you have finished reading the paragraph, look away from the book and try to tell yourself just what happens when a car is started. Check your recall by rereading the paragraph to see if you left anything out. If you did, try telling yourself the entire process again, including all of the steps.

WHAT MAKES AN AUTOMOBILE MOVE

When a person turns on the starting switch in his automobile, chemical energy in the storage battery starts to make electricity that turns the motor. The turning of the motor pumps gasoline through the carburetor, where the gas is mixed with air, and into the cylinders. The same turning of the motor shoots sparks from the spark plugs into the cylinders. When the gas-air mixture meets the sparks, the mixture burns explosively and expands. Since the top of the cylinder is closed, the expanding gas pushes down against a piston, a thick disk at the bottom of the cylinder. When the pistons are moved they turn a shaft that is connected through gears to the wheels. The turning of the wheels, of course, makes the car go.



In the next part you will find an explanation of how energy is produced in a steam engine. In reading this section, do the same three things that you did in reading the explanation about an automobile.



WHAT MAKES A STEAM LOCOMOTIVE OR SHIP MOVE?

The energy used in a steam locomotive or a steamship comes from the fuel that is burned. In the early days that fuel was wood. Now it is either coal or fuel oil. In a steam engine, the heat energy does not come from burning fuel inside the engine, as it does in a gasoline engine. Instead, the chemical energy of burning makes heat energy in a firebox beneath or beside a boiler.

Against the firebox in the engine is the boiler, which contains water. Heat energy goes from the fire into

the boiler, making the water boil and produce steam. The steam, trapped in the boiler, becomes so hot that it builds up a very great pressure.

Then the steam, under this high pressure, is released through valves into cylinders, where it expands just as the exploding gas in a gas engine does. This expansion pushes a piston, which turns a shaft connected to the wheels or the propellor. The heat energy in a steam engine is changed into mechanical energy through the expansion of water into steam and the pressure of the steam.

ACTIVITY 1

1. Write in your own words the steps in the process of starting an automobile to move. _____

2. On separate paper, write in your own words the process of starting a steam locomotive to move. _____

HOW FAR, HOW FAST, HOW MUCH?

Travel and numbers seem to go together. Usually when we read an article that has to do with transportation, some numbers are included to tell us about speed, mileage, distance, or cost. Below are some problems that have to do with these things.

You have practiced four different skills in reading problems. Now another is added:

5. Estimate the answer.

Before computing a problem, it is a good plan to estimate the answer. This will give you some idea of what your answer should be. If you find that there is a great difference between your estimated answer and the answer that you get from computing the problem, then you will know that you have made a mistake. The mistake may have been made either in estimating, or in computing.

If the problem is one in which you plan to add, subtract, multiply, or divide, you should use round numbers in estimating your answer. For example, if one of the numbers were 313 you would “round” it to 300. If the other number were 42, you would “round” it to 40. On the other hand if one of the numbers were 389 and the other were 49 you would round the numbers to 400 and to 50. You have learned how to round numbers in the elementary grades, so no additional explanation is needed.

Rounding the numbers makes it easy for you to work with numbers mentally, and still the answer will not be too far from the answer which you get by working with the exact numbers in the problem.

Here is an example of how to make an estimate:

1. What is an auto’s speed in feet per hour when it is travelling at 41 mph? (1 mile = 5,280 feet)

Let us suppose that you have gone through all of the other steps and have decided that you should multiply 5,280 by 41. You then would round 5,280 to 5,000, and 41 to 40. Next you would multiply 5,000 by 40. This equals 200,000, your estimated answer.

In actually computing the problem, you would get this answer:

$$\begin{array}{r} 5280 \\ \times 41 \\ \hline 5280 \\ 21120 \\ \hline 216480 \end{array}$$

So your estimated answer was reasonable. Both your estimate and your computation were right.

ACTIVITY 1—PRACTICE IN ESTIMATING*

Try estimating the answer to each of the problems below.

1. If riders of the Pony Express changed horses 81 times in making a journey of 1,639 miles, how far did a rider travel on each horse?

a. What are your rounded numbers? _____
Divide mentally and make your estimate of the answer.

b. What is your estimated answer? _____

c. Compute the problem:

d. What is your computed answer? _____

e. Was your estimated answer reasonable? _____

2. If it cost a company \$2,319,102 to build their first road and \$4,163,206 to build their second road, how much more did the second road cost than the first one?

a. What are your rounded numbers: _____

Subtract mentally and make an estimate of the answer.
What is your estimated answer? _____
Compute the problem:

b. What is your computed answer? _____

c. Was your estimate reasonable? _____

* Based upon material prepared by Francis J. Mueller.

3. Eddie has a motorcycle that weighs 624 pounds. His father's station wagon weighs 1,876 pounds more than the motorcycle. How much does the station wagon weigh?

You decide that you must add. Round off 624 to 600, and 1,876 to 1,900.

- a. What is your estimated answer? _____

Now compute:

- b. What is your computed answer? _____

- c. Was your estimate reasonable? _____

4. If a Conestoga wagon travelled 52 miles per day, how many miles would it travel in 29 days?

- a. What are your rounded numbers? _____

- b. Multiply mentally and make an estimated answer.

- c. What is your estimated answer? _____

- d. Compute the problem.

- e. What is your computed answer? _____

- f. Was your estimated answer reasonable? _____

ACTIVITY 2—PRACTICE IN USING ALL FIVE STEPS

1. The Wrights' entire airplane weighed 745 pounds, of which 179 pounds was the weight of the engine. How much did the airplane weigh without the engine?

- a. What picture do you see? _____

- b. What does the problem ask you to find? _____

- c. What facts does the problem give you to work with? _____

- d. What process should you use? _____

- e. What is your estimated answer? _____

Compute the problem and see if your estimated answer was reasonable. Use separate paper.

2. A rocket uses fuel at the rate of 275 pounds per second. It is in flight for 48 seconds. How much fuel does it use?

- a. What picture do you see? _____

- b. What does the problem ask you to find? _____

- c. What facts does the problem give you to work with? _____

- d. What process should you use? _____

- e. What is your estimated answer? _____

Compute the problem and see if your estimated answer was reasonable. Use separate paper.

3. A Navy single-stage rocket reached an altitude of 158 miles. An Army two-stage rocket reached an altitude of 253 miles. How much higher did the two-stage rocket fly than the one-stage rocket?

- a. What pictures did you see? _____

- b. What does the problem ask you to find? _____

- c. What facts does the problem give you to work with? _____

- d. What process should you use? _____

- e. What is your estimated answer? _____

Compute the problem and see if your estimated answer was reasonable. Use separate paper.

4. A rider paid a total of \$38.50 to pass 11 turnpikes. What was the average charge for passing each turnpike?

- a. What picture do you see? _____

- b. What does the problem ask you to find? _____

- c. What facts does the problem give you to work with? _____

- d. What process should you use? _____

- e. What is your estimated answer? _____

Compute the problem and see if your estimated answer was reasonable. Use separate paper.

USING A TABLE OF CONTENTS

All through high school you will need to look up much information in addition to that found in your regular textbooks. Ability to use the table of contents on the first pages of a book will be a very helpful skill for you to possess. See how well you can use the Table of Contents on the next page.

You read an article on transportation in Unit Four. Let us suppose that you become interested in certain types of transportation and want to find out more about them. Let us suppose further that you go to the library and get a book on transportation. On the opening pages of this book you find the Table of Contents which appears on page 69.

Decide where you would look in the book to find more information about certain topics mentioned in the questions below.

In answering each question: (1) look at the large chapter headings to find out under which one you might be most apt to find the information asked for; (2) read through the items under that heading to find on what page that particular topic is discussed; (3) write your answers to the questions.

1. Suppose you wish to find out more about *turn-pikes*:
 - a. Under which of the chapter headings will you look? _____
 - b. On what page in the chapter will you find *turn-pikes* discussed? _____
2. Suppose you wish to read more about using women to carry things:
 - a. Under which chapter heading will you look? _____
 - b. On what page in the chapter will you find this topic discussed? _____
3. Suppose you are interested in reading more about *covered wagons*:
 - a. Under which of the chapter headings will you look? _____
 - b. On what page in this chapter will you find this topic discussed? _____
4. Suppose you wish to find out something about *Peter Cooper's "Teakettle on Wheels"*:
 - a. Under which of the chapter headings will you look? _____
 - b. On what page in the chapter will you find this topic discussed? _____
5. Suppose that you wanted to find out through which of the Western states the *first transcontinental railroad* ran:
 - a. Under which of the chapter headings will you look? _____
 - b. On what page in the chapter will you find this topic discussed? _____
6. Suppose you are interested in the *first gas engine*:
 - a. Under which chapter heading will you look for this topic? _____
 - b. On what page in the chapter will you find the topic discussed? _____
7. Suppose you wish to find out something about the *automobile changing family life*:
 - a. Under which of the chapter headings will you look? _____
 - b. On what page in the chapter will you look? _____
8. Suppose you wish to find out something about the invention of the *first balloon*:
 - a. Under which chapter heading will you look? _____
 - b. On what page in the chapter will you find this topic discussed? _____
9. Suppose you wish to find out something about the use of *trucks*:
 - a. Under which chapter heading will you look? _____
 - b. On which page in the chapter will you find this topic discussed? _____
10. Suppose you wish to find out something about the subject of *space travel*:
 - a. Under which chapter heading will you look? _____
 - b. On what page in the chapter will you find this topic discussed? _____

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WORKING WITH PARTS OF WORDS

On page 54, you were given practice in breaking compound words into parts as an aid in getting their meaning. On this page you will have practice in dividing words made up of root words, prefixes, and suffixes, as an aid in figuring out their meanings.

Finding Root Words

Many of the words that you read are made up of a root word plus another syllable or two at the beginning or end of the word, or perhaps both at the beginning and at the end.

Underline the root word in each of the words below. The first one has been done for you.

- | | | | |
|--------------------|---------------|---------------|-------------|
| a. <u>favorite</u> | b. courageous | c. collection | d. mentally |
| e. impolite | f. government | g. reform | h. adjust |

Finding Prefixes

A word element placed before a root word to change its meaning is called a *prefix*.

Draw a line under the prefix in each of the words below. The first one has been done for you.

- | | | | |
|--------------------|-------------|--------------|-------------|
| a. <u>dis</u> band | b. surround | c. remote | d. enable |
| e. department | f. explain | g. intensely | h. describe |

Finding Suffixes

A word element placed at the end of a root word to change its meaning is called a *suffix*.

Underline the suffix that has been added to each of the words below. The first one is done for you.

- | | | | |
|-----------------------|--------------|--------------|---------------|
| a. station <u>ary</u> | b. favorable | c. adjusting | d. collection |
| e. tinkering | f. moisture | g. lighter | h. studying |

Changing Meanings with a Prefix

The prefix trans means "cross-," "across," "over," "beyond," "through," "to the other side of." How does trans affect the root words below?

Prefix	Root Word	Prefixed Word	Meaning
trans (across, over, to the other side)	port (to carry)	transport	to carry across or over the country
trans	scribe (to write)	transcribe	to write over, copy
trans	pose (to position)	transpose	
trans	form (to shape)	transform	

Write the meaning of the following words:

- a. transpose _____
- b. transform _____

Changing Meanings with a Suffix

The suffix ment means "the process of" or "the result of."

Suffix	Root Word	Suffixed Word	Meaning
ment (result or process of)	govern	government	the process of governing
ment	measure	measurement	the result of measuring

Write the meaning of the following words:

- a. movement _____
- b. statement _____

WORKING WITH MATHEMATICS WORDS

The words below appear in all widely used *mathematics* textbooks at your level. No doubt they are in the *mathematics* book that you are using.

Work out the pronunciation of each of the words and study the meaning that it has in *mathematics*. Even if you think you know the pronunciation and meaning of each word, check to make sure.

1. account
ă kount' A record of bills owed, as to a store, by persons paying later.
2. amount
ă mount' The sum total of two or more sums or quantities.
3. area
ă're â Space on the surface of something.
4. balance
băl'ăns The amount left after a person has paid part of his bill.
5. budget
bűj'ět A way to plan one's income to meet expenses.
6. denominator
dě nŏm'ĩ nă'těr The part of a fractional number that comes below the line.
7. numerator
nű'měr ā'těr The part of a fractional number that comes above the line.

7	numerator
9	denominator

8. multiplicand
műl tĩ plĩ kănd' The number which is multiplied.
9. multiplier
műl'tĩ plĩ ěr The number by which a number is multiplied.
10. product
prŏd'űkt The answer obtained by multiplying one number by another.

234	multiplicand
6	multiplier
1,404	product

11. cipher
sĩ'fěr The zero (0).
12. decimal
dēs'ĩ măl A part of a number expressed in a scale of tens.
13. digit
dĩj'ýt Any whole number under ten.
14. dividend
dĩv'ĩ dënd In a division problem the dividend is the number which is divided.
15. quotient
kwŏ'shěnt The answer which one gets by dividing the dividend by the divisor.

8	quotient
divisor 6	dividend

See how well you know the meaning of these *mathematics* words by choosing one to write in the blank space in each of the sentences below.

1. The number 6 is a _____.
2. The zero is called a _____.
3. The total _____ of Mrs. Steven's bill was \$327.40.
4. The _____ of the classroom floor was 1,200 square feet.
5. Mr. Hinks kept a very careful _____ so that he wouldn't spend more money than he took in for goods he sold.
6. Mrs. Holmes charged the cost of her new table.
She had an _____ with a furniture store.
7. Mrs. Wright paid \$25.00 on her bill of \$35.00.
This left a _____ of \$10.00.

8. Suppose a number is written like this: .43. What is it called? _____
9. In the fraction $\frac{6}{8}$, the number 6 is known as the _____. The number 8 is the _____.

10. Here is a multiplication problem:
$$\begin{array}{r} 47 \\ 8 \overline{) 376} \end{array}$$
 The number 8 is the _____. The number 376 is the _____. The number 47 is the _____.

11. Here is an example in division:
$$\begin{array}{r} 3 \\ 8 \overline{) 24} \end{array}$$
 The number 8 is the _____. The number 3 is the _____. The number 24 is the _____.

ăte, ât, căre, ârt, păth, vácation, ábound, infănt; bē, mēt, hēr, hēre, ěnough, silěnt; ĩce, ĩt, Aprĭl; ŏld, nŏt, ŏr, ŏbey, sŏft, cŏnnect, fŏŏd, fŏŏt; cűbe, cűt, bűrn, menű (French), ũnite, circűs.

WORKING WITH SOCIAL STUDIES WORDS

The words below are in all *social studies* textbooks at your level. They are also in geographies and histories which you study. Many of these words have several meanings with a special meaning in these particular subjects. Be sure that you understand this special meaning in *social studies*.

Study the pronunciation and meaning of each word. Even if you think you know all of them, check each one to make sure.

ancestor ăn'sēs tēr	A forefather; one from whom a person is descended.
ancient ăn'shēnt	Existing in a far-past time or period; very old.
anthracite ăn'thrá sīt	Hard coal.
basin bā's'n	A river basin is the entire part of a country drained by a river and all its branches.
bituminous bī tū'mī nŭs	Containing mineral pitch or asphalt, as soft (bituminous) coal.
century sēn'tū rī	One hundred; in <i>history</i> , one hundred years.
citizen sīt'ī zēn	An inhabitant of a country who owes allegiance to the government and is protected by the government.
communication kō mŭ'nī kā'shŭn	Interchange of thoughts by words, letters, or messages.
conservation kōn'sēr vā'shŭn	Act of keeping safe, guarding, preserving.
consul kōn'sŭl	A person appointed by a government to live in a foreign country to look after citizens of the appointing government.
control kōn trōl'	In <i>social studies</i> , <i>control</i> usually means the power of authority to rule as of one country over another.
House of Commons Hous Kom'ənz	An assembly of elected members who make the laws of certain countries.
parliament pār'li mēnt	Parliament is composed of the Senate and the House of Commons.
Senate Sēn'it	The upper and smaller branch of a parliament or assembly that reviews laws, made up of representatives from each province who are appointed for life.

See if you know the meaning of each of the words as it is used in *social studies*. Choose one of the words to write in each of the blank spaces below.

- One hundred years ago there were no airplanes or automobiles. Great changes have taken place during the last _____.
- We should protect the forests. All of us should be interested in their _____ for many good reasons.
- The Mackenzie River has a very fertile _____.
- Do you have any relic in your home that was once owned by an _____?
- The Canadian _____ consists of 102 members appointed for life.
- Mr. Swan does much for his country. He is a good _____.
- The _____ spends much time making the laws of Canada.
- Radio, telegraph, and television are all used for _____.
- Canadians who visit a foreign country sometimes go to the Canadian _____ for advice. He protects their interests and also those of Canadian seamen.
- Paul saw a tree in the Rocky Mountains that was 1,000 years old. It was very _____.
- The Colonists in our country were under the _____ of England for a long time.
- The Senate and the House of Commons make up the Canadian _____.
- Hard coal is called _____.
- Soft coal is called _____ coal.

ăte, ăt, căre, ărt, văcătıon, ăbound, infănt; bē, mēt, hēr, hēre, ănough, silēnt; ĩce, ĩt, Aprĭl; ăld, nôt, ăr, ăbey, sôft, cŏnnect, fŏod, fŏot; cŭbe, cŭt, bŭrn, menŭ (French), ŭnite, circŭs.

WORKING WITH MORE NEW WORDS IN UNIT SIX

Here are several other words that you will meet in reading Unit Six. See if you can work out the pronunciation and meaning of all of these words. You will enjoy the stories and articles more if you have no trouble with the new words. Add d if necessary.

conclusion kōn klōō'zhǔn	A reasoned decision; the end; the last part of something; a final settlement.
comparison kōm pǎr'ĩ sǔn	Examining two or more things to discover their likeness and differences.
continental kon ta nĕn tǎl	That which is like a continent, of a continent.
department dě pǎrt'mĕnt	A part; a division of a government, a business, or a school.
device dě vīs'	A scheme, invention, tool, or instrument.
hesitate hĕz'ĩ tāt	To delay.
hygroscope hĩ'grō skōp	An instrument which roughly shows changes in moisture in the atmosphere.
isobars ĩ'sa bār	Lines on weather maps which connect places having the same average atmospheric pressure.
meteorological mĕ ti ar a lōg a kal	That which had to do with the atmosphere and the weather.
phrase frāz	A group of two or more words which form a sense unit but not a complete sentence.
precipitation prĩ sip a tǎ shan	The act of throwing down; the depositing of moisture in the form of rain, snow, or dew.
prepare prĕ pǎr'	To make ready; to arrange in order beforehand; to put into a state for use.
prophet prōf'ĕt	One who predicts future events.
represent rĕp'rĕ zĕnt'	To present by means of something standing in the place of.
saturate săt'ŭ rāt	To soak completely or fill until no more can be taken up, as water with salt.
severe sĕ vĕr'	Extreme, serious, grave.
telegraph tĕl'ĕ gráf	An instrument for sending messages at a distance.

- Tom didn't answer at once. He thought he had better _____.
- Mrs. Stone bought a _____ which showed changes in moisture in the air.
- Nancy didn't go to school. She had a _____ cold.
- Mrs. White was about to _____ dinner.
- Mr. Johnson could forecast the weather. He was a weather _____.
- Mary Ann didn't write an entire sentence. She just wrote one _____.
- The sponge was _____ with water.
- The _____ map had many
- _____ drawn on it to show the places where the air pressure was the same.
- As the rain fell the _____ was measured by the gauge.
- Housekeepers find a can opener a useful _____
- The man rushed to the railway station to send the urgent message by _____.
- Jim was asked to _____ the school in the contest.
- Mr. Thomas looked at two suits and made a _____ before buying.
- Mrs. Skinner bought a table in the furniture _____ of Jones' store.
- When you experiment think carefully before drawing your _____.
- As the air mass formed over the continent, it was considered _____.

ăte, ăt, câre, ărt, vácation, ăbound, infănt; bĕ, mĕt, hĕr, hĕre, ĕnough, silĕnt; ĭce, ĭt, Aprĭl; ăld, nôt, őr, ăbey, sôft, cőnnect, főöd, főöt; cŭbe, cŭt, bŭrn, menŭ (French), ũnite, circŭs.

UNIT SIX

WINDS, RAIN, AND SUNSHINE

*The story below tells about some interesting weather toys.
Read to find out what these toys are and how they work.*

This is an easy story and you should be able to beat your last record in reading it fast. Time yourself. Force yourself to read as fast as you possibly can, and still enjoy the story.

Beginning Time: Hr. _____ Min. _____

WEATHER-WISE *

When Bill reached the top of the hilly street on his way home from school, he saw something in the western sky that made him stop and stare. A silvery spot hung over the foothills of the Rockies, and in broad daylight, too! Could it be a flying saucer? He wasn't sure he believed in them. Besides, the spot wasn't moving. There was only one other thing it could be, and Bill was excited.

"What are you looking at, Bill?" Kay Mills, a girl in his class, stopped beside him. She lived out his way, but he didn't know her very well.

"See that silvery-white spot?"

"You mean the moon?"

"Moon nothing," Bill replied. "That's one of those weather balloons from the airport in Calgary. It carries a big box of weather instruments, to record facts about the upper air. What wouldn't I give for some weather instruments!"

"How can a little balloon carry a big box of instruments?"

"That 'little' balloon is 175 feet tall, Kay! It's made of thin plastic and filled with helium."

Kay looked at him open-mouthed.

"Weather's my favorite subject," Bill explained. "Anything about weather interests me a lot. You know, I read the other day that there's a certain kind of paper treated with chemicals that changes color

with the weather. Someone has made this paper into flowers. When the air is dry the flowers are blue. When a storm is coming they turn pink. What do you think of that!"

"Say," Kay cried out eagerly, "if you're so interested in weather, maybe you know something about a 'weather house.'"

"Enough to know I'd like to have one," Bill replied. "But there isn't a chance."

"I have one. Can you stop at my home?" Kay sounded urgent. "My sister sent it to me from Germany. She's teaching over there in one of the Army schools this year. And nobody at our house knows what it's for or what to do with it."

"I'd like to have a look," Bill said, trying not to sound too eager for fear he'd be disappointed.

Bill beamed when Kay handed him the brightly-painted, quaint-looking little weather house. It had two tiny birds on the roof, a birdhouse in the gable, a squirrel near the porch, and wooden figures of a man and woman at the open doors. "It's a beauty," he exclaimed.

"But what's it for?"

Bill was watching the little wooden figures intently. Then he began tinkering with the knob at the top of the house. "I think it needs some adjusting," he said.

"Adjusting for *what*!"

"Well, you see, a weather house is a simple hygroscope," Bill said. "This one isn't adjusted for Alberta."

* Adapted from a story prepared for this book by Aileen Fisher.

Kay quite puzzled, dropped down into a chair. "I give up!"

Bill told her that a hygroscope is a device for showing changes in the amount of moisture in the air. The platform on which the man and woman stand is hung from the top of the house with a string of catgut. When the air is moist, the catgut shortens and makes the platform move, so the man comes out of his door. When the air grows dry, the catgut lengthens, and the man goes in and the woman comes out.

"I have not seen them go anywhere since the package came two days ago," Kay said. "Maybe it's too dry in Alberta."

Bill was tinkering with the knob again. Ever since reading about the collection of "weather prophets" at the Meteorological Office in Toronto, he had been eager to see a weather house and to try it out.

"I have read about some other kinds of weather toys," said Bill. "There is a monk with a hood on his shoulders. When it is going to rain the hood comes up over his head.

"Then there is the paper butterfly that opens its wings when the weather is fair, and closes them when it's going to rain.

"There is the figure of a little man with an umbrella hanging from his back. When it's going to rain the umbrella comes up over his head.

"And there is the tree toad on a ladder. He climbs up and down as the weather changes.

"But this German model with the old man and woman is the most common kind of a hygroscope. How I wish I had a sister in Germany!"

"It would be nice to know when rain is in the air," Kay said, picking up the weather house and turning the little wooden figures with her finger. "Then I'd know how to dress. Bill, would you mind . . . ?" She hesitated. "Would it be asking too much . . . for you to take it home to adjust it and check it?"

"Asking too much!" Bill was smiling all over. "Say, Kay, if I could have it for a week or two, I'd know this weather house inside out. I could make one for myself, using this for a model. I've always wanted one, but couldn't figure out the measurements just from a picture. And I couldn't go to Germany to get a real one!" He laughed. "Now I don't have to. It just goes to show—you never can tell what's going to happen when you're lucky enough to spot a weather balloon!"

	<i>Hr.</i>	<i>Min.</i>	<i>Sec.</i>
Ending time:	_____	_____	_____
Beginning time:	_____	_____	_____

No. words $\frac{790}{\text{No. seconds}} \times 60 = \text{_____ WPM.}$

COMPREHENSION QUESTIONS

- In what city did Bill live?
a. Montreal b. Calgary c. Victoria
- What was the spot in the sky which Bill saw?
a. the moon b. a weather balloon c. a flying saucer
- From what country did the weather house come?
a. France b. Germany c. England
- Why didn't the wooden figures go in and out?
a. They were broken.
b. They were too large.
c. They were not adjusted to work in Alberta.
- What is a hygroscope?
a. a device for measuring rainfall
b. a device for use in looking at weather balloons
c. a device for showing changes in moisture
- What kind of string was used in hanging the platform?
a. wrapping twine b. catgut c. hemp
- What happens to the string when the air is moist?
a. It shortens and makes the platforms move.
b. It falls down on the platform.
c. It grows longer.
- Where was the collection of "weather prophets" Bill had read about?
a. in Halifax b. in Toronto c. in Winnipeg

- Find one of the weather toys Bill described.
a. a lizard that turned pink
b. a picture in which clouds came and went
c. a monk with a hood that came on and off
- Why hadn't Bill made a weather house himself?
a. He didn't know how.
b. He didn't have time.
c. He couldn't figure out the measurements.

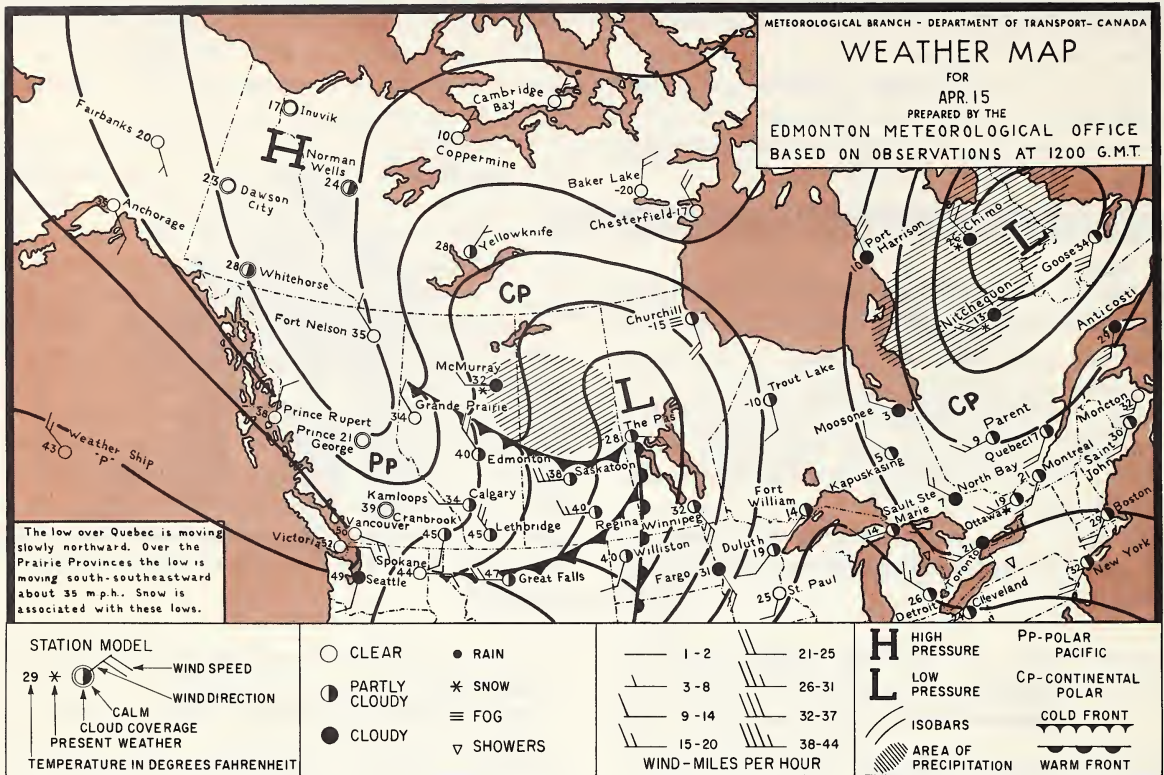
Comprehension score: _____ Speed: _____ WPM.

DISCUSSION QUESTIONS

Write your answers on a separate piece of paper.

- How would you feel if you looked up in the sky some day and saw a weather balloon?
- What facts do you think the instruments in the balloon might record?
- Why did Kay hesitate in asking Bill to take the house and adjust it?
- Why was Bill happy to take the house?
- What do you think Bill may become when he is grown?
- Which of the different weather toys described in this story would you like to have for your own?
- Can you explain what makes the weather toy of your choice behave as it does?

WEATHER



WEATHER MAPS

READING WEATHER MAPS

A circle (o) on the map indicates a town, and an additional circle (O) shows calm in that area.

The number near the circle indicates the high temperature in the town or the date that the weather map was prepared.

The shaded part of the map indicates parts of the country on which moisture fell during the six hours before the time shown on the map.

The isobars show points at which the air pressure is the same.

A warm mass of moving air is called a warm front, and a cold front is a cold mass of moving air.

The weather toys you have just read about do not really forecast the weather. All they can do is to show changes in the amount of moisture in the air.

True weather forecasts can be made only as a result of careful study. Scientists who work with the Meteorological branches in each of the provinces spend all of their time studying weather conditions. They publish daily weather maps which give information about weather in our own country and elsewhere.

If you learn to read these maps you can find out a great deal of information about the weather.

READING THE SYMBOLS

A weather map has its own symbols which stand for words and phrases. Learning to read these symbols on a weather map is somewhat like learning to read new words in a pre-primer when you were in first grade. See how well and how quickly you can learn to read weather map symbols.

Study all of the symbols under the map. You will notice that the symbol for "Cold Front" is a black bar with points on the lower side of it. The symbol for "Warm Front" is a black bar with half-circles below it. Notice the symbol for each of the other weather conditions.

Read the paragraphs beneath the map, carefully. These paragraphs give you additional information about map symbols.

MAKING THE SYMBOLS

Try making the symbols that stand for the different words and phrases. The first one is done for you.

- | | | | |
|---|-----------------------------|-----------------------------|---------------------------|
| 1. cold front | 2. warm front | 3. high pressure | 4. showers |
|  | _____ | _____ | _____ |
| 5. clear | 6. rain | 7. partly cloudy | 8. snow |
| _____ | _____ | _____ | _____ |
| 9. cloudy | 10. fog | 11. isobars | 12. low pressure |
| _____ | _____ | _____ | _____ |
| 13. calm | 14. west wind
(5 m.p.h.) | 15. east wind
(5 m.p.h.) | 16. area of precipitation |
| _____ | _____ | _____ | _____ |

READING THE MAP

- | | |
|---|--|
| 1. What was the temperature in Winnipeg on the day that the map was prepared? | 9. What place had fog? |
| _____ | _____ |
| 2. What was the temperature in Sault Ste. Marie? | 10. Which places were calm? |
| _____ | _____ |
| 3. What was the temperature in Churchill? | 11. What was the strength of the wind in |
| _____ | Cranbrook? _____ |
| 4. What was the temperature in St. John? | Lethbridge? _____ |
| _____ | Port Harrison? _____ |
| 5. How much cloud coverage was there in | 12. Name two cities which may receive snow soon. |
| a. Toronto? _____ b. Edmonton? _____ | _____ |
| c. Moncton? _____ d. Montreal? _____ | _____ |
| e. Regina? _____ f. Prince George? _____ | _____ |
| g. McMurray? _____ h. Fort William? _____ | 13. Where is the warmest place in Canada? |
| 6. What cities were faced with a cold front? | _____ |
| _____ | 14. Can warmer or colder weather be expected in |
| 7. Name two cities that were faced with a warm front? | Calgary? |
| _____ | _____ |
| 8. In what places was it snowing? | 15. Can warmer or colder weather be expected in |
| _____ | Southern Manitoba? |
| _____ | _____ |

HOW DID OUR WEATHER FORECASTING SERVICES DEVELOP?

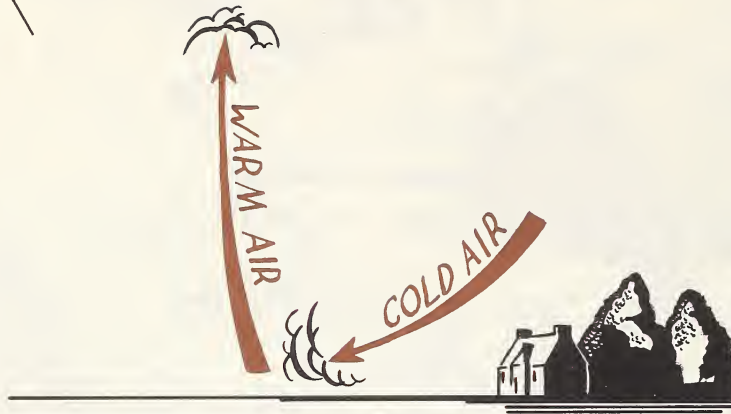
The first weather observations to be taken in Canada by instruments were in the late 1700's. In 1839 a British Army Lieutenant established the first permanent observatory in Toronto. Although Canadians conducted this work from 1853, the Meteorological Service of Canada was not established by the Dominion Government until five years after Confederation. The work expanded steadily until the 1930's and 1940's, when the Air Force and the Commercial Airlines caused a sensational growth in the weather services by their demands for weather information. Now there are more than 1600 weather observing stations sending information to twelve main forecasting offices across Canada.

Trace the growth of weather forecasting services by noting the developments in the left hand column and the corresponding date on the right.

<i>Development of Weather Services</i>	<i>Date</i>
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____



WHY WEATHER CHANGES



The weather is always changing. One day it is clear and sunny and another day it may be cold or rainy. Why does the weather change so often?

Scientists have studied many problems in regard to weather. As a result of their experiments, most of our questions about the weather can be answered.

The selection below does not state problems and tell us how they were solved. It gives us information to explain why certain things happen. It is the “cause and effect” type of information. In this kind of selection, we are told about the causes of certain things happening and what effect these causes have in changing something.

In the first paragraph, we find a sentence in which we are told that “Weight creates a force called pressure.” In this phrase, *weight* is the cause of something happening. The thing that weight causes to happen is that it “*creates a force called pressure.*”

In the next sentence we read that “Changes in air pressure make air move.” In this sentence “*Changes in air pressure*” is the cause of something happening. The thing that happens is that these changes “*make air move.*”

1. Glance quickly through each one of the paragraphs to find all of the “cause and effect” sentences that you can. Underline each of these “cause and effect” sentences. In the first paragraph, one “cause and effect” sentence has been underlined for you.

2. After you have found and underlined the “cause and effect” sentences, reread each paragraph carefully to find out how and why the causes had the effect that they did.

CAUSES OF CHANGING WEATHER

First let us discuss air. Without air, there would be no weather, no wind, rain, snow, or clouds. Air is all around us; we live at the bottom of a great ocean of air. We can't see it, but we can feel it when it moves. There are miles of air above us, pressing down with great weight on the earth and everything on it. Because it presses down on us from all directions at the same time and because we are able to bear this weight, we do not seem to feel it. But, scientists have proved that air has weight and that anything that has weight creates a force called *pressure*. Changes in air pressure make air move.

Air is a gas that expands when heated, gets lighter, and moves upward. When air is cooled it gets heavier, sinks close to the earth, and flows like water in a great river. As warm air rises, cold air rushes in to take its place. That is how the wind is born. The winds that blow high above us are caused by the warm air running away from cold air. The wind we feel near the earth is the heavy cold air trying hard to catch the warm air. Changes in temperature cause the air to move. And of course there are many changes, so air is moving practically all of the time. You can nearly always feel a little wind blowing.

If it were not for the movement of the earth, the air probably would always travel in straight lines. But as the earth spins and moves around the sun, it pulls on the air around it. This pull makes the air curve to the right or left. So the warm air and the cold air zig and zag instead of moving straight ahead. In this way the moving earth controls, to some extent, the direction in which the air moves.

As the air dances across the earth's surface, it passes over great bodies of water, flat dry plains, high mountains, and low cool valleys. Each one of these areas has a different temperature, so that the moving air becomes warm, then cool, and then warm again. This constant changing of temperature makes the air

bounce and whirl and rise and fall. Warm air soaks up water vapor until it becomes saturated. Air that is cooled suddenly shrinks. Some of the moisture is squeezed out, and clouds are formed. The clouds, which are made of small drops of water, float around until they become chilled. Then it rains or hails or snows, depending on how cold it is at that time.

So we can say the sun heats the earth. The earth transfers this heat to the air. The air becomes lighter, and then it moves. The motion of the earth changes the path in which the air moves. Cold areas and warm areas on the earth's surface govern the speed at which air moves. The different movements of the air cause the weather to change from day to day.

ACTIVITY 1—CAUSES AND EFFECTS

Draw a line from each cause to the effect it produces.

Causes

1. Changes in temperature
2. As the earth spins
3. The pull of the earth
4. The motion of the earth
5. The different movements of air
6. Weight
7. The sun
8. Cold areas and warm areas
9. The earth
10. Warm air

Effects

- a. transfers heat to the air.
- b. creates a force called *pressure*.
- c. heats the earth.
- d. govern the speed at which air moves.
- e. make the air move.
- f. it pulls on the air around it.
- g. makes the air curve.
- h. changes the path in which air moves.
- i. cause the weather to change.
- j. soaks up water vapor.

ACTIVITY 2—TRUE-FALSE STATEMENTS

Write "Yes" after each sentence that is true, and "No" after each one that is false.

1. Scientists have proved that air has weight. _____
2. When air is heated it expands and rises upward.

3. Air is not a gas. _____
4. The motion of the earth causes air to move in straight lines. _____
5. When air is cooled, it becomes heavier. _____

6. Clouds are made up of small drops of hail or snow.

7. The miles of air above us have no weight. _____
8. Without air there would be no weather. _____
9. The winds high above us are caused by cold air running away from warm air. _____
10. When all is said and done, we can sum up by saying that it is the many different movements of the air which cause the weather to change so often. _____

Applying What You Have Learned About Reading in Science

When studying in your *science* books, look each chapter over carefully before you read it to see if it has to do chiefly with causes and effects. If it does, find all of the sentences that state causes and effects. These are the main ideas in this kind of writing. After finding the main causes and effects, then read to find the smaller ideas that give more information about each cause and effect.

You will find the cause-and-effect type of article more often in your *social studies*, *history*, and *geography* books than you will in *science*. Look for such articles in these books and, in reading them, use the same plan that you used in working with the *science* article in this unit.

READING GRAPHS

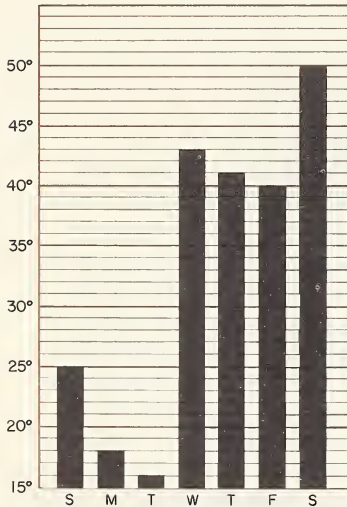
The reading of graphs is another kind of reading which you often have to do. There are graphs in most *social studies* books and in most *science* books. Nearly all *mathematics* books contain a chapter on graphs. Newspapers and magazines often show graphs.

A graph is a diagram that pictures number values. If a person can read graphs well, just a glance will enable him to grasp and compare number values relating to the subject that is graphed. A graph offers a quick and easy way to get information that has to do with number values.

The three kinds of graphs that are used most often are: (1) the bar graph, (2) the broken-line graph, and (3) the circle graph. You will now have practice in reading each of these types of graphs.

GRAPHS *

THE BAR GRAPH



Maximum Temperatures in Calgary During a Week in December

This graph gets its name from the fact that it is made up of bars of different lengths. In order to read the graph correctly, you need to do these things:

1. Read the phrase beside the graph so that you will know what it is supposed to picture.
2. Read the numbers at the left of the graph. These numbers represent the range of degrees of temperature during the week. You will notice that there are five degrees between figures.

If you look carefully you will see that there are five squares on the paper between each two numbers. Each square represents one degree.

The second bar extends three squares beyond 15 degrees, so this bar should be read as representing 18 degrees.

3. Read the letters at the bottom of the graph and be sure you understand what they represent. In the graph above, the letters stand for days in the week. The first S at the left stands for Sunday, the M stands for Monday, and so forth. The first bar at the left

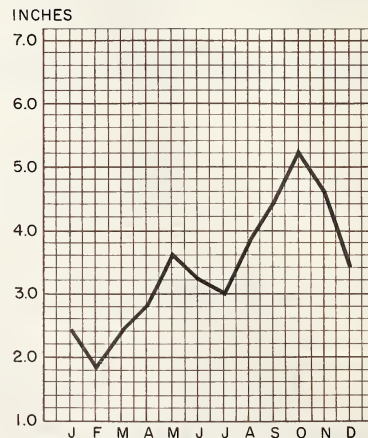
shows what the temperature was on Sunday, the second bar shows what the temperature was on Monday, and so on.

Now try reading the bar graph above. Write your answers.

1. What was the maximum temperature on Wednesday?

2. Which day was the coldest, and what was its maximum temperature? _____
3. Which day was the warmest, and what was its maximum temperature? _____
4. Which two days were the coldest? _____
5. How much warmer was it on Thursday than on Friday?

BROKEN-LINE GRAPH



Monthly Rainfall in Sydney, Nova Scotia for a Typical Year

In the graph above, dots are placed at points that would be the tops of bars if a bar graph had been used. Then these points are joined by broken lines.

In working with this graph, do the following things:

1. Read the phrase beside the graph to make sure that you know what the graph represents.

* Based upon materials prepared by F. J. Mueller.

2. Look at the numbers on the left side of the graph. Note the word *inches* above these numbers. This means that the numbers stand for inches of rainfall. How many steps are there between each two sets of numbers?

Just one inch is represented between each two sets of numbers. Since there are five squares between each set of numbers, what part of an inch does each square represent? No doubt your answer is 0.2 of an inch, which is right.

Two of the dots on the graph fall directly in line with one full inch. The other dots fall above or below the full inch. By counting the number of squares above the figure below the line at which the dot falls, you can find how many tenths should be added to that number to give you the right figure.

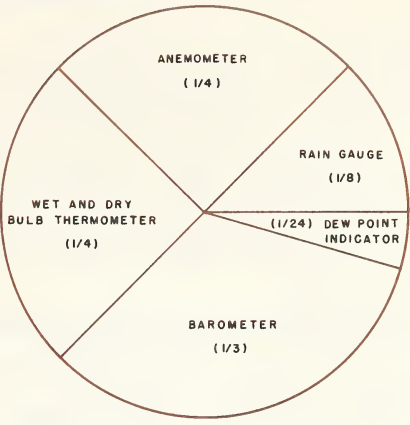
For example: The first dot falls at a point 2 squares above 2.0. So, you add 0.4 to 2.0, which gives 2.4 inches of rainfall represented by that dot.

3. Next examine the letters beneath the graph. You will notice that there is a letter directly beneath each dot on the graph. These letters represent months in the year: J stands for January, F for February, and so forth. The dot above J shows the average rainfall for January, the dot above F shows the average rainfall for February, and so on.

Now try reading this broken-line graph. Write your answers to the questions.

1. In which month does Sydney have its greatest amount of rainfall? _____ How much? _____
2. In which month does Sydney have its least amount of rainfall? _____ How much? _____
3. State Sydney's four driest months in order
 - a. _____
 - b. _____
 - c. _____
 - d. _____
4. According to the graph, which month has the greater rainfall, April or May? _____
5. The *range* is the difference in value between the greatest and smallest numbers. What is the range in monthly rainfall in Sydney during a typical year? _____

CIRCLE GRAPH



Relative Amounts Spent for Weather Instruments

Bill's father gave him \$24.00 to spend for weather instruments. The circle graph above gives you an idea of how Bill's \$24.00 was divided amongst the different instruments.

- Read this graph as follows:
1. Notice that some sections are different in size. Each section represents the part of Bill's \$24.00 that was spent for one of the instruments.
 2. Read the name of the instrument in each section.
 3. Read the fraction beneath each name. This number shows the fractional part of the whole amount which Bill paid for the instrument named. For example: the fraction $\frac{1}{8}$ appears beneath "Rain Gauge." This means that Bill spent $\frac{1}{8}$ of his \$24.00 for a rain gauge.

- Now see if you can answer these questions:
1. Which was Bill's most expensive instrument? _____
 2. Which was Bill's least expensive instrument? _____
 3. Which two instruments cost the same? _____
 4. Which instrument cost \$1.00? _____
 5. How much did Bill spend for his rain gage? _____
 6. What fraction of Bill's total sum was spent on the thermometer and anemometer together? _____

Applying What You Have Learned About Reading Graphs

Whenever you find a graph on a page that you are about to read, study the graph first of all. See how much information you can get by reading it. Be sure to read the title of the graph so that you will understand what the graph represents. Be sure also that you understand the meanings of the numbers and letters or words at the sides of the graph or on sections of the graph.

USING AN INDEX

Suppose that the story and the articles which you have just read have caused you to be very much interested in *weather*. Suppose further that you decide to find more information on this topic.

The index in a *science* textbook would be one good place for you to look. In the back of most textbooks there is an index which lists the topics discussed in the book and gives the pages on which the discussions can be found. Often several smaller topics are listed under each larger topic. If you are interested only in reading about one of the smaller topics, you can save yourself much time by using the index. The index will enable you to turn directly to the page on which the smaller topic is discussed. You won't need to read through an entire chapter just to find information about this one part of the entire discussion.

In the index on the next page, you probably will have no difficulty in finding the large topic *Weather*, nor will you have trouble in finding any of the smaller topics under this large topic.

It may be, however, that you want to do a very thorough job of finding all of the information in the book about weather and topics related to weather. Then you must search further than the one heading *Weather*. In such a case you should look up and down all of the columns to see if you can find any other topic that might have something to do with weather. In looking at the list of words beginning with *T*, for example, you will find the word *Thermometers* and the page numbers on which thermometers are discussed. In looking under the general heading *Water* you will find *rainfall*. Both thermometers and rainfall have something to do with weather. You will want to turn to the pages on which these topics are discussed, and read them along with the topics listed under the general heading *Weather*.

Now, with these hints in mind, see how well you can use the index on page 83.* Do Activity 1. Check the correct answers.

ACTIVITY 1

1. On which of these pages would you find the general topic *Weather* discussed?
a. 259-260. b. 208-209. c. 133-134. d. 247-263.
2. On which of the pages under the general topic *Weather* would you find information about *temperature*?
a. 253-256. b. 248-249. c. 250-253. d. 255-256.
3. From the index you can tell that *air movement* is discussed on pages:
a. 201, 204-207. b. 253-254. c. 248, 253-256. d. 260-265.
4. From the index you can tell that the book contains information about *changes along front*. On what pages would you find this information?
a. 257, 260. b. 251-254. c. 255-256, 259. d. 248, 251-254.
5. On which of these pages would you find a discussion of *information from weather stations*?
a. 255-256. b. 247-248. c. 250-253. d. 259-260.
6. If you didn't know what a *weather vane* is, you could find information about this topic on pages:
a. 259-260. b. 158-161. c. 253-254. d. 259-260.
7. From this index you can tell that pages 262-263 tell something about:
a. weather balloon. b. value of forecasts.
c. temperature. d. air movement.
8. From this index you can tell that pages 259-260 give information about:
a. moisture. b. weather stations.
c. temperature. d. weather vane.
9. On which pages would you find information about a *weather map*?
a. 262-263. b. 253-254. c. 248-249. d. 260-262.
10. From this index you can tell that *weather balloons* are discussed on pages:
a. 260-262. b. 257, 260. c. 255-256. d. 258-259.
11. Under the general topic *Weather*, which of these smaller topics is not discussed:
a. value of forecasts. b. moisture.
c. changes along front. d. toy weather prophets.
12. Under the general topic *Water*, you will find the smaller topic of *evaporation*. On what page is this topic discussed?
a. 61. b. 135. c. 136. d. 149.

* Ames, Maurice U., Arthur O. Baker, Joseph F. Leahy, Science in Today's World (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1950), p. 277.

13. In which part of a book is the index usually found?
- after each chapter.
 - after the table of contents.
 - at the very beginning of the book.
 - at the end of the book.
14. If you wish to find something about the general topic *Water vapor*, on what pages would you look?
- 137–138.
 - 155–156.
 - 133–134.
 - 146–147.
15. If you wish to read about *condensation of water vapor*, on what page would you look?
- 137.
 - 237.
 - 251.
 - 154.
16. From this index to what pages would you turn to find information about *thermometers*?
- 17, 20, 152–253.
 - 31, 34, 249, 250.
 - 109–110, 242–243.
 - 35, 37, 246, 248.
17. From this index to what page would you turn to find information about *tropical air masses*?
- 263.
 - 260
 - 255.
 - 259.
18. On what pages would you find more information about *rainfall*?
- 143–144.
 - 138–139.
 - 157–160.
 - 158–159.

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WORKING WITH SOCIAL STUDIES WORDS

The words below appear in the most widely used *social studies*, *history*, and *geography* books at your school level. You will be better able to study your lessons in these subjects if you know the meanings and pronunciations of these words. Perhaps you think you can pronounce each one correctly, and that you know the special meaning of each word as it is used in these subjects. Do the work carefully anyhow—just to make sure. Use the marked words at the bottom of page 85 for reference.

Study the pronunciation of each word. Say the word to yourself. Then read and think about its meaning.

colonist kōl'ō nĭst	A member of a colony. A colony is a group of people in a country separated from the mother country, but still under the control of the mother country.
continental kōn'tĭ nĕn'tāl	Of or pertaining to a continent, or to one of the large divisions of land on the globe.
expansion ĕks păn'shŭn	Spreading out, unfolding, or increasing; extending or enlarging surface, business, or government.
frontier frŭn tĕ'r	That part of a country which fronts on or faces another country; an advance region that is being settled by human beings for the first time.
independence ĭn'dĕ pĕn'dĕns	Freedom from the control, support, influence, or help of others. The colonists fought for their independence.
inhabitant ĭn hăb'ĭ tănt	One who lives permanently in a place; one who lives in a house, town, city, county, or state.
interdependence ĭn'tĕr dĕpĕn'dĕns	Reliance of one country upon others who in turn depend upon the first.
manufacturing măn'tŭ făk'tŭr ĭng	Working raw or unfinished materials into suitable forms for use; making goods for sale, usually by machinery.
occupation ōk'ŭ pā'shŭn	The work that one does; or holding or taking possession of.
pioneers pĭ'ō nĕr'z'	People who go before, as into the wilderness, to prepare the way for others.
political pō lit'ĭ kăl	Having to do with policy or conduct of government pertaining to those who make a business of politics.
population pōp'ŭ lă'shŭn	The whole number of people in a country, section, or area.
production prō dŭk'shŭn	The process of producing or bringing forth; the making of goods for human wants.

See how well you understand the meaning of each of the words you have been studying. Select one word to write in each space. Add *s* if necessary.

- Early people cleared away forests and got the land ready for farming. They were therefore often called _____.
- In early times the border between Canada and what is now the United States was a wilderness. A few minor battles were fought on this _____.
- The United States bought the country between the Mississippi River and the Rocky Mountains. This was a vast _____ of territory.
- There are large numbers of factories in our country. Much _____ is done in Canada.
- Much more wheat was raised after the invention of the reaper. This invention increased _____ greatly.
- People who live in a colony that is controlled by another country are called _____.
- The American colonies won _____ from England.
- Mr. Brown lives in a very busy city. He is an _____ of Ottawa.
- A carpenter's _____ is working with wood.
- No country can exist all by itself. There must be _____ among countries.
- Parliament deals with the _____ affairs of our government.
- Montreal has a _____ of over 1,000,000 people.
- Rolls, jam, and coffee are served for breakfast all over the continent of Europe. Most people call this a _____ breakfast.

WORKING WITH SCIENCE WORDS

The words below are found in *science* textbooks at your level. Make sure that you can pronounce each of these words correctly and that you know what each one means as it is used in *science*. Even if you think you know many of the words already, do the work just the same, to make sure.

Study the pronunciation of each of these words. Say the word to yourself. Then carefully read the meaning of the word.

dissolve To pass into a liquid in which the
dĩ zõlv' material can no longer be seen; to
 melt or break up.

element A substance which cannot be sepa-
ě'l'ě měnt rated into substances simpler than
 itself. Gold is an element; so is iron.

humidity Dampness or wetness, especially in
hũ mĩd'ĩ tĩ the atmosphere.

iodine A salty gray solid, sometimes used in
ĩ'ò dīn treating goiter.

mercury A heavy, silvery-white fluid metal.
mũr'kũ rĩ It is used in barometers and ther-
 mometers and for other scientific
 purposes.

microscope An instrument which enlarges the
mĩ'krõ skõp image of objects which we look at.

morphine A bitter white crystalline substance
mõr'fēn used to calm people in pain.

niacin A member of the group B vitamins.
nĩ'á sīn The lack of niacin causes pellegra.

nitrogen A colorless gas in the air. It makes
nĩ'trõ jēn up about four-fifths of the volume of
 the air; the other fifth is made up
 largely of oxygen.

oxidize To burn slowly without flame, as in
õk'sĩ dīz the cells of the body; to combine
 with oxygen, or more oxygen.

penicillin A drug made from green molds, used
pēn'ĩ sīl'īn in combating bacteria. Penicillium
 mold is found on decaying or pre-
 served fruit, cheese, and other foods.

perspiration Sweat; liquid secreted by the sweat
pũr'spĩ rā'shũn glands, made up mostly of water.

phosphorus A whitish or yellowish element
fõs'fõ rūs which has a faint glow in moist air.
 It was once used in making matches.

riboflavin Vitamin B₂.

rĩ'bõ flā'vīn

solution A liquid containing a dissolved sub-
sõ lũ'shũn stance.

thiamine Vitamin B₁.

thĩ'á mēn

See how well you know the meanings of the *science* words on the left side of the page. Choose one of them to write in each of the blank spaces below.

1. The air is made up largely of _____.
Only one fifth of it is made up of oxygen.
2. A heavy, silvery-white fluid metal is used in ther-
mometers. This metal is _____.
3. The doctor thought there were bacteria in Mr.
White's body. He gave Mr. White _____
_____.
4. Tom placed salt in a glass of water. He watched
it _____.
5. He used the _____ of salt and
water in an experiment.
6. Everything looks much larger than it really is when
you look through a _____.
7. The doctor used a solution of _____
in treating Mr. Steel's goiter.
8. Iron cannot be divided into simpler substances.
It is an _____.
9. There was much moisture in the air. The
weatherman said the _____
was high.
10. Mr. Birch was very ill and in great pain. The doc-
tor gave him some _____.
11. Mr. Clark needed vitamin B₂ or _____.
12. Mrs. Clark was taking vitamin B₁, which is called
_____.
13. At one time a whitish or yellowish element was
used in making matches. This element is com-
monly called _____.
14. When we are warm, our sweat glands pour out
_____.
15. The child had pellegra. He was given large doses
of one of the B vitamins called _____.
16. Fats burn or _____ in the cells
of the body.

âte, ât, câre, ârt, pâth, vâcation, âbound, infănt; bē, mēt, hēr, hēre, ênough, silĕnt; ĭce, ĭt, Aprĭl;
ôld, nôt, ôr, ôbey, sôft, cõnnect, fõod, fõot; cûbe, cût, bûrn, menü (French), ûnite, circûs.

WORKING WITH ROOT WORDS, PREFIXES, AND SUFFIXES

Finding Separate Words in Compound Words

Draw a line between the two separate words in each of these compound words:

- a. waterway b. stronghold c. highland d. Frenchmen e. bagpipes f. hotheads

Finding Root Words

Draw a line under the root word in each of these words:

- a. freedom b. travellers c. wooden d. sternly e. reserve f. boldest
g. classification h. building i. American j. almost k. happened

Finding Prefixes

Draw a line under the prefix that has been added to each root word:

- a. belong b. already c. prepay d. disbelief e. indebtedness f. return

Finding Suffixes

Draw a line under the suffix that has been added to each root word:

- a. continental b. different c. careful d. action e. fatty f. Scottish

Changing Meanings with Prefixes

The prefix un means not. Add un to each of the words below, then tell what meaning the word has after un is added.

- | | | |
|---------------|-----------------|-------|
| 1. happy | _____happy | _____ |
| 2. successful | _____successful | _____ |
| 3. willing | _____willing | _____ |
| 4. true | _____true | _____ |
| 5. wise | _____wise | _____ |
| 6. fair | _____fair | _____ |

Changing Meanings with Suffixes

The suffix ist added to a word means "one skilled in," "one who does or practices," or "one who believes in." Add ist to each of the words below and then tell what meaning the word has after ist is added.

- | | | |
|------------|--------------|-------|
| 1. art | art_____ | _____ |
| 2. organ | organ_____ | _____ |
| 3. balloon | balloon_____ | _____ |
| 4. real | real_____ | _____ |
| 5. harp | harp_____ | _____ |
| 6. humor | humor_____ | _____ |
| 7. special | special_____ | _____ |
| 8. journal | journal_____ | _____ |

WORKING WITH NEW WORDS WHICH YOU WILL MEET IN UNIT SEVEN

The words below are in Unit Seven, which you will soon read. You will be able to read this next unit more rapidly and will understand it better if you know the pronunciation and meaning of each of these words. The meaning given for each word is the meaning with which it is used in Unit Seven.

Study the pronunciation of each word. Say the word to yourself, using the markings to guide you in its pronunciation. Read the meaning of the word and think about it.

abuse a būz'	Improper or injurious use; bad treatment; a bitter scolding.
apprentice a pren'tis	A person who is learning a trade or business.
bribe brīb	Any gift, profit, or advantage used wrongly to influence public or official action.
councillor koun'si lēr	A member of a council, a group of people called together to give advice and to discuss or settle questions.
editorial ed'i tōr'i al	An article in a newspaper or magazine written by an editor giving his opinion upon some subject.
emerge i mūrj'	To become visible; to come out from anything that covers up.
exile ek'sil	Banishment from one's own home or country. People are often exiled by law as a punishment.
Legislative Council lej'is lā'tiv koun'sil	A group of people who have duties in lawmaking.
portmanteau pōrt man'tō	An oblong suitcase hinged at the back and having two compartments which open like a book.
redress ri dres'	A remedy, relief, or correction; a setting right of a wrong.
reform ri fōrm'	To make better by removing the faults; a change for the better; to become better by giving up something evil for that which is good.
ruffian ruf'i an	One who is cruel, brutal, and often lawless.
starch stārch	A white, tasteless, powdery substance found in seeds, bulbs, and tubers.
sue sū	To seek justice through legal action; to beg for or plead.
type tīp	An object which has the common characteristics of a group; a piece of metal or wood which has on its upper surface a raised letter for use in printing.
welfare wel'fār'	A condition of well being; health, happiness, and prosperity.

See how well you know the meanings of the words with which you have been working. Choose one word to write in each of the blank spaces in the sentences below.

- The traveller was carrying a _____ in his hand.
- The _____ attended the council meeting to give his advice on the matter.
- Joan took good care of her pets. She was concerned about their _____.
- Men who are learning the printing trade are called _____.
- The leader did not want to leave his country but was forced into _____.
- Harold read the _____ in the newspaper to learn the editor's opinion on the subject.
- The _____ were kicking and hitting the young boy. He was bruised from the _____.
- _____ he received.
- The people expected _____ for the damage done to their property.
- As soon as the people _____ we will be able to take their pictures with our cameras.
- Quebec is the only province in Canada with a _____ composed of twenty-four appointed members.
- Potatoes contain a white, powdery, tasteless substance called _____.
- Donning his cap and gown the lawyer entered court to _____ on behalf of his client.
- The printer set the _____ carefully for the headlines of his paper.
- Any attempt made by the person to influence the mayor's decision was unsuccessful. He refused to take the _____.
- The lawmakers decided _____ was necessary in the prison.

âte, ât, câre, ârt, pâth, vâcation, âbound, infânt; bē, mēt, hēr, hēre, ênough, silênt; îce, ît, Âprîl; ôld, nôt, ôr, ôbey, sôft, cōnnect, fôod, fôot; cûbe, cût, bûrn, menü (French), ûnite, circûs.



UNIT SEVEN

REBELLIOUS YEARS

The story below is based on a true happening. William Lyon Mackenzie was nicknamed the "little rebel" in his lifetime. David is an imaginary character, but this incident actually happened.

Time yourself in reading the story. See if you can beat your last record.

Beginning Time: Hr. _____ Min. _____

THE LITTLE REBEL

It was June 8, 1826. David Patterson was on an errand for his mother. The quiet of a summer evening was settling over the little town of York, the capital of Upper Canada, and a pleasant breeze was blowing from Lake Ontario.

Arriving at the intersection of Dundas and Yonge Streets, David heard loud shouting coming from a building and saw some young men emerge. They were carrying something.

"Dump the type into the lake," ordered one.

Sounds of breaking glass and smashing wood came from the building.

"That's Mr. Mackenzie's printing shop," gasped David.

Running to the building, he heard the sound of hammers from within and through the broken windows he could see several young men breaking up the press and smashing the furniture. Several citizens of York stood watching. David recognized two government officials among them.

"Why don't you stop them?" he cried to the on-lookers.

Someone laughed but no one moved to stop the destruction. David turned and ran. His one thought was to reach home.

"Mr. Mackenzie has made many enemies among the ruling class of Upper Canada by his criticisms of them," said Mr. Patterson when he had listened to David's account of the raid. "In last week's *Colonial Advocate* he accused certain government officials of taking bribes from men who wanted large tracts of good land. Those ruffians who wrecked the shop probably belong to the families of those officials, or are friends of them."

On his way to school the next afternoon, David saw a larger crowd than usual in front of the hotel. The stagecoach from Kingston was due. David saw Mr. Mackenzie's two apprentices, Dick Jarvis and Tom Wilcox.

"They must be there to meet Mr. Mackenzie," he thought, and crossed the street to join them.

The stage coach appeared, the horses running tiredly. Scarcely had they been stopped in front of the hotel than the coach door banged open and a little man hurriedly descended. The crowd grew silent.

"Which of us is going to tell the master?" murmured Dick.

"We'll tell him on the way to the office," answered Tom.

David ran forward to greet his friend.

"Well, well, David," Mr. Mackenzie began kindly, and then, catching sight of his two apprentices approaching, he roared, "Why aren't you at your work?"

"Mr. Mackenzie, come with us. We have something to show you," said Tom, respectfully but firmly.

Dick silently took his employer's portmanteau and the three set off at such a rapid pace that David could scarcely keep up with them.

"Well," said Mr. Mackenzie impatiently, "What's happened? Why are you two away from the shop when there's work to be done for next week's *Advocate*?"

"The press is broken," Tom began.

"Broken? The type must be set up tomorrow," shouted Mr. Mackenzie.

David was glad they had come to the door of the shop for Tom was saying quietly, "There isn't any type. They threw it all in the Bay."

"They threw it in the Bay! My type! Who did?" screeched Mr. Mackenzie.

And then he saw the broken door and the smashed windows. Hastily he pushed open the door and stepped inside. The others followed and stood in silent sympathy as the little man looked around at the destruction. He stared at the broken chairs, the smashed desk, the books flung on the floor with torn-out pages lying among them.

Dick, still clutching the portmanteau, looked mutely at Tom.

"Brace yourself for the storm," whispered Tom.

But this time there was no storm. There was no outburst of screaming temper from the fiery little Scotsman. Dick cast a frightened look at his co-worker. David's heart bled for his friend who had worked so hard to make the *Colonial Advocate* a success. Mr. Mackenzie placed his hat on the battered desk and smoothed down his red hair with both hands.

Once when David was stacking newspapers at the back of the room he had seen Mr. Mackenzie, in a fury, clutch his red thatch. It had come off, exposing a

shiny, bald head. Ever afterwards, whenever his friend reached to remove his hat, David had a nervous moment. Suppose Mr. Mackenzie's wig came off!

"Who did this?" asked Mr. Mackenzie quietly.

"Several rich young men came here last evening," answered Tom. "We tried to stop them but they drove us back. I know their names."

"Young heirs and friends of the ruling class, no doubt," said Mr. Mackenzie. "My last editorial must have angered them more than usual."

He paced back and forth.

"They think they have stopped me, but I'll show them," he shouted.

Dick and Tom brightened and David asked eagerly, "What will you do, Mr. Mackenzie?"

"I'll sue the young ruffians for damages," he yelled, shaking his fist.

Mr. Mackenzie did that and was awarded more than enough money to buy a new printing press. Then he continued attacking government abuses more violently than before.

	Hr.	Min.	Sec.
Ending time:	_____	_____	_____
Beginning time:	_____	_____	_____

No. words	820	$\div$ 60 = _____ WPM
No. seconds	_____	

Find your total reading time and "Words per minute" in the same way that you have done before. There are 820 words in the story.

COMPREHENSION QUESTIONS

- York was built on:
a. Lake Michigan b. Lake Erie c. Lake Ontario
- The publisher of the newspaper was:
a. Tom Wilcox b. Mackenzie c. Mr. Patterson
- Tom and Dick met the stagecoach because:
a. they had nothing else to do
b. they felt sorry for Mackenzie
c. they liked to meet the stagecoach
- The raiders threw into the lake:
a. the press b. the type c. the office furniture
- The *Colonial Advocate* was:
a. a lawyer b. a colonist c. a newspaper
- Mackenzie criticized the:
a. the settlers b. Tom and Dick
c. the ruling class
- The men wrecked the shop because:
a. they were ruffians b. they were angry
c. they thought it was fun
- Tom and Dick regarded Mackenzie with:
a. liking b. fear c. dislike
- Mackenzie could be called:
a. an official b. a government man c. a reformer

10. Mackenzie was generally:

- a. friendly to all people b. friendly to some
c. friendly to none

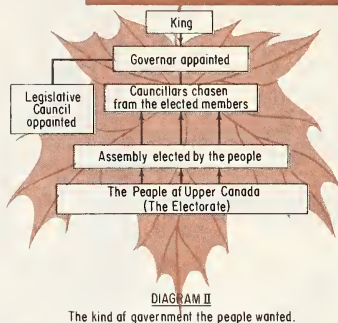
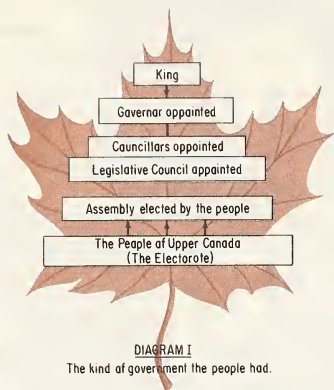
Comprehension score: _____ Speed: _____ WPM

DISCUSSION QUESTIONS

Write your answers on a separate piece of paper.

- Do you like Mr. Mackenzie? Why?
- Why didn't David stay to watch the raid?
- Did Dick like Mr. Mackenzie? Give evidence to support your opinion.
- Did Mr. Patterson favor the ruling class or did he agree with Mackenzie's criticisms of them? Give reasons for your opinion.
- Do you think the raid on the shop gained more supporters for Mackenzie? Give reasons for your opinion.
- Mr. Mackenzie seemed sure that the court would award him damages. Why do you think he believed it would?
- What was David's feeling about Mr. Mackenzie? Give evidence to support your opinion.
- Do you think that Mackenzie's accusation of dishonesty angered the ruling class more than his other accusations had? Give reasons for your answer.

WHY WAS THE GOVERNMENT CRITICIZED?



You have been reading about a rebel who criticized the government and its officials and their friends. This article explains why Mackenzie and many other colonists of Upper Canada were dissatisfied with the kind of government they had, and why they were justified in criticizing government officials.

1. Study the diagrams. (a) What is the main difference? (b) Why would the colonists want the type of government shown in Diagram II?
2. Read the boldface headings to get the idea of the topics to be discussed in this article.
3. Read the article through as rapidly as you can; but you are reading to remember facts; therefore, note these mentally as you read.
4. Record the time taken to read the article, after you have studied the diagrams and the boldface headings.

Beginning Time: Hr.____Min.____

THE GOVERNMENT OF UPPER CANADA

The Constitutional Act 1791. By this Act each colony of Canada was given a government of four parts: (a) a governor who was appointed by the King, (b) an executive council to advise him and help carry on government business, (c) a legislative council to make laws, (d) a legislative assembly to help make laws.

The governor, who was the King's representative, chose the men for both councils and they were appointed by him for life. The people of the colony elected the men they wanted in the assembly. They did not hold office for life.

Dissatisfaction Begins. At first the people of Upper Canada were pleased with being allowed to elect an assembly to help make laws. They thought that by this means, laws would be made. The first governor, John Graves Simcoe, was liked. He worked hard to make the country happy and prosperous. One important thing that he did that pleased and helped the settlers was to build two roads from York, the Capital of Upper Canada. A highway was constructed from Yonge Street to Lake Simcoe, and from Dundas Street to the Grand River. However, Governor Simcoe was sent to another colony and some other governors of Upper Canada did not have the interests of the settlers at heart. The members of the assembly and the

people who had elected them found that their wishes in regard to law making were often ignored. Settlers' rights and welfare were disregarded. Dissatisfaction with the government began.

The Situation. The advisers of the governor—called councillors—did not need to please the people because they received their positions from the governor and held them for life. They and the governor had the power to carry on government business as they chose. No one had control over them except the King. He was far away and not very interested in his colonists. The men who were elected by the people to help make laws, those who made up the Assembly, found that the governor and his councils could, and did very often, refuse to allow the laws the people wanted and needed. The governor usually chose his councillors from the colonists who were rich and important and educated. Many were interested only in growing more rich, and some were dishonest in their dealings with the settlers. Because the councillors were a law unto themselves, settlers who had been cheated by a government official could seldom obtain redress.

Some of the Abuses. Many abuses grew in the colony because of this situation. The worst ones had to do with the granting of land, government jobs, and contracts; and the schools and churches. The people complained that:

1. The councillors took for themselves, or their friends or relatives, government jobs and contracts for building roads and canals.
2. Grants of land to settlers were not fairly made. The best land was often given to those who paid money to a government official.
3. Large grants of land were set aside for the Church. This was the Anglican Church and members of other churches thought this was unfair.
4. Large grants of land were given to government officials and their friends.
5. The many large tracts of land were usually left uncleared, and this prevented the building of roads and divided the settlements so that it was difficult to open schools or build churches and mills.
6. People who complained against these abuses were accused of being disloyal to the government. Sometimes they were punished by having their property seized. Sometimes they were imprisoned. Robert Gourlay was kept in jail for a long time because he called a meeting of the discontented colonists.

	<i>Hr.</i>	<i>Min.</i>	<i>Sec.</i>
Ending time:	_____	_____	_____
Beginning time:	_____	_____	_____

ACTIVITY 1—UNDERSTANDING VOCABULARY ACCURATELY

Give the meaning of these words and phrases as they are used in the article:

1. redress _____

2. have their interests at heart _____

3. abuses _____

4. councillors _____

5. assembly _____

6. dealings _____

7. widespread _____

8. champion _____

9. elected members _____

10. appointed _____

Abuses Led to Armed Rebellion. Criticism and anger became widespread. William Lyon Mackenzie attacked abuses and government officials in his newspaper. For ten years he was the people's champion in their demands that the councillors be brought under the control of the people by a change in the government. When his bitter attacks failed to abolish the many abuses or bring about the government reforms desired by the people, Mackenzie rashly organized and carried out an armed rebellion against the government forces.

Abuses Corrected. Although the rebels were defeated, the British Government was aroused to the need for reform. A new act provided that the executive council be chosen from the elected members of the Assembly. Now the councillors had to please the people and agree to the laws they wanted. The governor was expected to do what his councillors advised. Abuses gradually disappeared. Mackenzie, who had been in exile in the United States, was pardoned and returned to a happier Upper Canada.

No. words $\frac{788}{\text{No. seconds}} \times 60 = \text{_____ WPM}$

ACTIVITY 2—GETTING FACTS ACCURATELY

Write your answers to these questions in sentences:

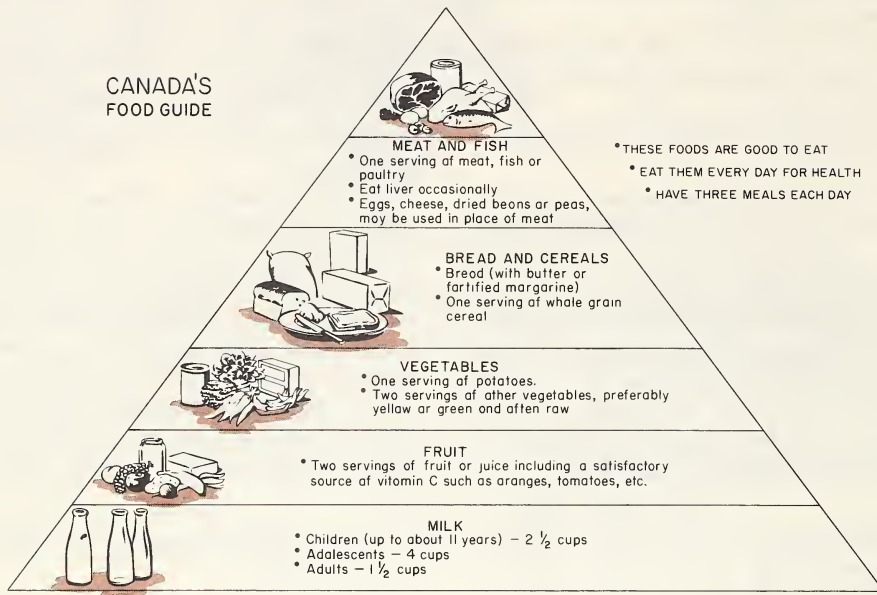
1. Which diagram shows the kind of government provided by the Constitutional Act?

2. A weakness in the Act allowed government officials to disregard the wishes and rights of the people. What was the weakness?

3. List four abuses suffered by the people.
 - a. _____
 - b. _____
 - c. _____
 - d. _____
4. By what means did Mackenzie try to stop these abuses?

5. As shown by Diagram II, what was the main reform of government that was wanted by Upper Canadians?

FOODS FOR YOUR NEEDS



During Mackenzie's lifetime a traveller stopped for dinner at a farm house. He was served fried pork, eggs, new potatoes, and pancakes. Which of the foods in the diagram above were missing in the traveller's dinner?

Why would the traveller's diet have been improved if he had included these other foods?

This question can be answered only by studying the classifications of food as scientists have arranged them. The selection below will tell you about these classifications. You should read it in the same way that you read the selection on the classification of animals, pages 20–21, and the classification of plants, pages 50–51.

1. Read all of the boldface headings to find what the classifications are.
2. Do Activity 1 on page 93.
3. Read the article carefully to find out:
 - a. what each of the main classifications of food does for the body which the others do not do.
 - b. what particular foods are included under each classification.
4. Do Activity 2 and Activity 3 on page 93.

WHAT CLASSES OF FOOD DO YOU NEED?

Your body is made up of several chemical elements. These elements are oxygen, carbon, hydrogen, nitrogen, calcium, and phosphorus, and small amounts of salt, sulfur, iron, magnesium, and potassium. Some of these elements you get from air and water, but the other elements must come from your foods. You need several different kinds of foods to get all of them. Food is anything taken into your body that will aid in your growth. From your food your body must build bones, muscles, blood, and nerves.

* Based upon material prepared by Anne E. Burgess.

PROTEINS FOR GROWTH AND REPAIR OF CELLS

Nitrogen for cell-building comes from protein foods. Meats, milk and other dairy products, eggs, poultry, fish, nuts, peas, beans, lentils, and whole-grain cereals contain proteins. The body is made of billions of cells, all of which must have nitrogen. Peas, beans, lentils, clovers, and alfalfa contain nitrogen. When animals eat clover and alfalfa, they get their supply of nitrogen. We can get our proteins by eating not only peas, beans, lentils, nuts, cereals, and dairy products but also by eating meats from animals.

CARBOHYDRATES FOR ENERGY

You need energy in order to move about and do things. You also need heat energy to keep you warm. Sugars and starches in your food produce much of this energy. These energy-giving foods are called *carbohydrates*. They contain carbon which burns like a fuel when it reaches the cells of your body. Carbon combines with oxygen in the cells and burns slowly, so slowly that there is no flame. Heat energy, however, is given off during this slow burning, or *slow oxidation*, as it is called.

Sweets and starches of all kinds belong to this class of carbohydrate foods. Bread, cake, cereals, and potatoes, for example, contain starch and sugar. Most vegetables and fruits also have varying amounts of starch and sugar.

FATS AND OILS FOR HEAT AND ENERGY

Another class of food, also containing carbon, produces more heat than most carbohydrates. These are the fatty, oily foods, such as fat meats, butter, mar-

garine, and cooking oils. The cooking oils are often made from vegetables, such as corn, olives, peanuts, coconuts, and soybeans.

In winter and in cold climates, people can use more of the fats and oils than they can when the weather is warm.

MINERALS FOR GOOD HEALTH

Besides proteins, carbohydrates, and fats, the body needs minerals. Iron is needed for the red blood cells, calcium and phosphorus for bones and teeth. Salt is needed by all tissues. Small amounts of iodine, magnesium, and potassium are required to keep the different organs working smoothly.

Where do you get minerals? Largely through your food is, again, the answer. Green and yellow vegetables contain calcium, phosphorus, iron, and traces of other minerals. Sea foods contain the iodine needed to prevent goiter. Salt has to be added to your food. Without these minerals you cannot be truly healthy, no matter how much food you eat.

ACTIVITY 1—CLASSIFYING FOOD

The four classes of food discussed in the article are:

1. _____ 2. _____

3. _____ 4. _____

ACTIVITY 2—MAKING A CHART

On separate paper, copy and fill out a chart like the one below. Allow yourself plenty of space. Write the name of each of the four classes of food. State its use in the body. Mention some foods in which this particular class is found.

Class of Food	Use	Where Found
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____

ACTIVITY 3—CHOOSING GOOD MEALS

Knowing about foods is not enough. Can you choose good meals for yourself? Which is the better breakfast and why?

A	B
soft-cooked egg	toast
whole wheat cereal	cocoa
buttered toast	jam
milk	

Write your answer here: _____

Which lunch provides the better balanced diet? Tell why?

A	B
sweet roll	hamburger on buttered bun
bottle of pop	cabbage and carrot salad
ice cream	milk

Write your answer here: _____

Applying What You've Learned About Reading Classification Selections in Science

You have read three *science* selections in this book in which the information is arranged in classifications. You have learned that the best way to read such a selection is to get the classifications clearly in mind, and then find out what makes each classification different from the others and what belongs under each classification.

In Activity 2 you made a chart that gives all the necessary information about the four classes of food in a few words. When reading classification selections in your *science* book, you will often find it helpful to make a chart of this kind. Such a chart sums up what you have read and gives you the whole "picture" at a glance.

HOW MUCH DOES IT COST TO EAT?



Here are some problems about the cost of food. Try using all of the steps you have learned to use in reading problems as you work with the problems below.

PROBLEMS ABOUT FOOD COSTS *

1. Food costs in Canada have increased greatly since pioneer days. Although early costs are not given, we know, for example, that the average cost of milk increased from 8.9 cents a quart in 1913 to 23.4 cents in 40 years. How much did the price increase in that time?

a. What pictures do you see?

b. What does the question ask you to find out?

c. What facts are given to you?

d. What process are you going to use?

e. What is your estimate of the answer?

f. Compute the problem on a separate piece of paper.

g. What is your computed answer? _____

h. Was your estimate close? _____

2. How many times, counting one a day, would a pioneer's wife serve dinner in three years? (Use 365 days a year in these problems.)

a. What picture do you see?

b. What does the question ask you to find?

c. What facts are given to you?

d. What process are you going to use?

e. What is your estimate of the answer?

f. Compute the problem on separate paper.

g. What is your computed answer? _____

h. Was your estimate close? _____

3. If 23 people per day, on the average, had dinner at Montgomery's tavern, how many dinners would be served in a year of 365 days?

a. What picture do you see?

b. What does the question ask you to find?

c. What facts are given to you?

d. What process are you going to use?

e. What is your estimate of the answer?

f. Compute the problem on separate paper.

g. What is your computed answer? _____

h. Was your estimate close? _____

* Based upon material prepared by Donald Lentz.

4. The following table shows the units of energy, units of Vitamin A, and the cost per serving of foods in a special lunch in Bob's school cafeteria:

<i>Food</i>	<i>Energy Units</i>	<i>Vitamin A for Growth</i>	<i>Price</i>
Apple	76	120	\$.05
Salad	40	7,450	.06
Hamburger Sandwich	325	45	.15
Milk	165	350	.07
Ice Cream	148	415	.08
			\$.41

- If Bob orders the total lunch, how many energy units will he get?
- What picture do you see?

 - What does the question ask you to find out?

 - What facts are given to you?

 - What process are you going to use?

 - What is your estimate of the answer?

 - Compute the problem on separate paper.
 - What is your computed answer? _____
 - Was your estimate close? _____
5. If Bob omits the ice cream from his lunch, how many energy units will he get?
- What picture do you see?

 - What does the question ask you to find?

 - What facts are given you?

 - What process are you going to use?

 - On separate paper, make your estimate.
 - Compute the problem. Compare your estimate.

- What picture do you see?

 - What does the question ask you to find?

 - What facts are given you?

 - What process are you going to use?

 - What is your estimate of the answer?

 - Compute the problem on separate paper.
 - What is your computed answer? _____
 - Was your estimate close? _____
7. If 87 children ordered the entire lunch, how much money would the cafeteria take in, that noon?
- What picture do you see?

 - What does the question ask you to find?

 - What facts are given you?

 - What process are you going to use?

 - What is your estimate of the answer?

 - Compute the problem on separate paper.
 - What is your computed answer? _____
 - Was your estimate close? _____
8. Schools, housewives, and others often save by buying in large amounts. Bob's mother bought 24 cans of soup for \$3.75. How much did the soup cost per can?
- Do this last problem without any questions to guide you. Think of each step as you go along and do it mentally. When you are ready, set the figures down on paper and compute the problem in the usual way.

Applying What You Have Learned About Reading Mathematics Problems

When working with problems in your *mathematics* book, read each problem very carefully, think about it, and do the same things that you have done in working with the problems above. Probably you can do all of these steps mentally, without writing the several items on paper.

WORKING WITH MATHEMATICS WORDS

The words on this page are widely used in *mathematics* texts at your level. Many of them have a special meaning in *mathematics* which they do not have in other subjects.

Be sure that you can pronounce each of these words correctly, and that you know what each one means as it is used in *mathematics*. Even if you think you know many of these words, do the work anyway, to make sure. Use the marked words at the bottom of page 97 for reference.

Study the pronunciation and the meaning of each of the words below.

approximate
ă prŏk'sī mīt An approximate answer is one that is nearly but not exactly right. Thirty-five doughnuts are approximately equal to three dozen doughnuts.

column
kŏl'ŭm A perpendicular line of figures.

cube
kŭb A regular solid of six equal sides.



deposit
dē pŏz'it Money placed in safeguard or in a bank on one's credit; a partial payment on something to hold it until full payment is made.

endorse
ēn dŏrs' To sign one's name on the back of a check in order to cash it or to deposit it in one's name.

equilateral
ē'kwī lăt'ēr ăl A figure having all sides equal.

expenditure
ēks pĕn'dī tŭr Expense; money which is paid out; that which is paid out for the expense or cost of running a business.

gross
grŏs The whole, total, or entire sum without any deductions; also twelve dozen; 144 equals one gross.

linear measure
līn'ē ēr A measurement of length.

meter
mē'tēr A measure of length which in Canada is 39.37 inches; an instrument for measuring, such as a gas meter.

parallel
păr'ă lēl Lying evenly everywhere in the same direction but never meeting, as in parallel lines:

per capita
pēr kăp'tă "By the head"; for each individual person.

receipt
rē sēt' A written statement showing that goods or money have been delivered or paid; to mark paid.

total
tŏ'tăl All or the whole of a thing or the total number of things concerned; a sum of all parts or items.

volume
vŏl'ŭm Mass, bulk, or space occupied, as measured by cubic inches, cubic feet, or some other cubic unit.

Select a word from the left-hand side of the page to write in each space. Add d if necessary.

1. Nancy added up a long _____ of figures.

2. Mr. Thomas _____ a check so that he could cash it.

3. Jack drew a figure with equal sides. It was an _____.

4. The rug was 39.37 inches in length. It was just one _____ long.

5. Each person had to pay a tax of \$1.00. There was a \$1.00 tax _____.

6. Mr. White's total sales for the year amounted to \$9,325.15. This was his _____ income.

7. The number 99.99 is _____ equal to 100.

8. Lucy had a block with 6 sides. It was a _____.

9. Mr. Horn gave Mr. Gray a written _____ to show that Mr. Gray had paid his bill.

10. Mrs. Simpson bought 6 articles priced as follows: \$2.00, \$1.00, \$5.00, \$1.00, \$3.00. The _____ sum she paid was \$12.00.

11. When one measures length in feet and inches, he uses _____ measure.

12. The two sides of a sidewalk are _____.

13. A million barrels of water run over a certain waterfall each week. This is a large _____ of water.

14. Mr. Williams made a _____ of \$125.00 to his credit in the bank.

15. Mr. Stone spent \$21,000.00 for new farm machinery. This was a large _____.

WORKING WITH SCIENCE WORDS

The words below are used in practically all *science* textbooks at your level. You will be able to read better in your *science* books if you can pronounce all of these words correctly and understand their meanings.

Study the pronunciation of each word. Say the word to yourself. Then read and think about the meaning of the word.

aluminum ă lū'mī nŭm	Shining, grayish-white metal; very light.
amoeba ă mē'bă	One of the simplest known animals. It is just a jelly-like substance without legs, wings, or fins, yet it can move.
astronomy ăs trŏn'ô mī	The study of bodies in space: stars, planets, comets.
caffeine kăf'ē ĭn	A drug found in coffee and tea. Caffeine is a stimulant which causes some bodily activities to go on faster.
capillary kăp'ī lēr ĭ	One of the smallest blood vessels. The capillaries are found all over the body. Through their walls the blood gives off food and oxygen.
chlorine klŏ'rĕn	A greenish-yellow, strong-smelling gas. This gas is used in killing bacteria in drinking water. It is poisonous but is added in such small amounts that the water is harmless.
circulate sŭr'kŭ lăt	To move around and return to the same place.
concentrated kŏn'sĕn trăt'ĕd	When a large amount of a substance is in a solution, the solution is said to be concentrated.
nicotine nik'ô tĕn	A drug found in tobacco.
nucleus nŭ'klĕ ūs	The central part of a cell or of an atom.
pellagra pĕ lă'gră	A disease caused by a diet lacking in niacin.
protoplasm prŏ'tŏ plăz'm	The jellylike material of which a living cell is made.
protozoa prŏ'tŏ zŏ'ă	Single-celled animals. The amoeba and the paramecium belong to this large group of one-celled animals. <i>Protozoa</i> is the name of the entire group.
sedimentary sĕd'ī mĕn'tă rĭ	Sedimentary rock is made from a mass of material (sediment) deposited by water.

See if you know the meaning of each of these words as it is used in *science*. Choose one word to write in each blank space. Add s if necessary.

- Blood flows through the small _____ in the body.
- Mr. Hopkins dissolved a large amount of salt in _____ the water. The solution was _____.
- Mrs. Wood didn't want to drink too much coffee because of the _____ in it.
- The old man did not eat foods with niacin in them. He had a disease called _____.
- Tom found much _____ rock at the seaside.
- Animals that are made up of just one cell are called _____.
- The _____ is one of the simplest known animals.
- Drinking water is often treated with a greenish, strong-smelling gas called _____.
- Bob was much interested in the stars. He wanted to study _____.
- The central part of a cell is its _____.
- The jellylike material of which a cell is made is called _____.
- Mrs. Baker wanted some metal pots that were shining, grayish-white, and very light. She bought some made of _____.
- We know that the blood can _____ from the heart through the body and back again.
- The drug found in tobacco is _____.

ăte, ăt, căre, ărt, păth, văcation, ăbound, infănt; bĕ, mĕt, hĕr, hĕre, ĕnough, silĕnt; ĭce, ĭt, Aprĭl; ōld, nŏt, ōr, ōbey, sŏft, cŏnnect, fŏŏd, fŏŏt; cŭbe, cŭt, bŭrn, menŭ (French), ŭnite, circŭs.

WORKING WITH PREFIXES AND SUFFIXES

Meanings of Six Common Prefixes

un: not
trans: across

mis: wrong; wrongly
out: beyond; to be removed from

over: too; too much; above
under: below; not enough

A. Write the prefix before each of the words below, then tell what its changed meaning is.

- | | | |
|----------|----------------|-------|
| 1. un | _____ kind | _____ |
| 2. mis | _____ treat | _____ |
| 3. trans | _____ Atlantic | _____ |
| 4. under | _____ fed | _____ |
| 5. over | _____ work | _____ |
| 6. out | _____ law | _____ |

B. Write a word with a prefix representing each of these meanings:

- | | |
|---|--------------------------------|
| a. much too bold _____ | b. not able _____ |
| c. Sold below (the regular price) _____ | d. a wrong deed _____ |
| e. across the continent _____ | f. a view over something _____ |

Meanings of Eight Common Suffixes

ful: full; filled
ment: result or process of
less: without

er: one who
en: to make; made of
ness: state of being

ist: one who does a certain thing
ly: in a manner

A. Read the suffix at the left of each word. Write this suffix at the end of the word and then tell what the meaning of the word is after the suffix has been added.

- | | | |
|----------|--------------|-------|
| 1. less: | use _____ | _____ |
| 2. en: | hard _____ | _____ |
| 3. er: | farm _____ | _____ |
| 4. ist: | violin _____ | _____ |
| 5. ly: | rapid _____ | _____ |
| 6. ment: | move _____ | _____ |
| 7. ness: | kind _____ | _____ |
| 8. ful: | basket _____ | _____ |

B. Write a word with a suffix representing each of these meanings:

- | | |
|----------------------------|-------------------------------|
| a. one who plants _____ | b. one who plays a harp _____ |
| c. without a father _____ | d. made of wood _____ |
| e. in a close manner _____ | f. state of being sweet _____ |
| g. filled pail _____ | h. process of governing _____ |

WORKING WITH NEW WORDS WHICH YOU WILL MEET IN UNIT EIGHT

The words below appear in Unit Eight. You will be able to read this unit more rapidly and with better understanding if you know how to pronounce each of these words correctly and are sure that you understand the meaning of each one as it is used in Unit Eight.

Work out the pronunciation of each word with the help of the markings. Say the word to yourself. Read the meaning of the word and think about it.

commerce kom'ers	Trade or business, buying and selling in large amounts between different places.
culinary kū'lə-ner'i	Having to do with cooking, or used in cooking.
delicacy del'i-kə-si	Fineness of weave, quality, or make; fineness of feeling for small differences; a choice kind of food.
erosion ērō'zhūn	Wearing away of rocks at the earth's surface by wind, water, freezing.
fertile fur'til fer'til	Producing an abundance of grain, fruit, and vegetables.
graft graft	To fix a shoot from one tree or plant into another tree or plant, to grow there as part of it.
horticulture hōr'ti-kul'cher	The science of growing flowers, fruits, and vegetables.
humus hū'mūs	Vegetable or animal matter in soil. Humus contains minerals needed for plant growth. It is extremely useful also in holding water in soil.
hybrid hī'brid	Bred from two different races, varieties, or species; of mixed origin.
illumine ī'lū'min	To light up, make bright.
prolific prə-lif'ik	Producing much; producing many offspring.
quartz kworts	The most common of all minerals; found in many rocks. The glassy-looking mineral in granite is quartz. Some of the stones used in rings are quartz—opals, amethysts, onyx.
rotation rota'shun	Changing in order; the same thing coming again and again at the same place in a series.
scion sī'on	Bud or branch cut for grafting or planting; a descendant.
texture tex'tur	The tightness or looseness with which particles in a substance are woven together.
tolerate tol'ə-rāt	Allow, permit, bear, endure, put up with.

See how well you understand the meanings of the words you have been studying. Choose one of the words to write in each of the blank spaces below.

- Rabbits were once so _____ in Australia that they ate all the crops.
- _____ between countries is important, as few countries have all the goods they need.
- The rock had been worn smooth by _____.
- Sand has a very loose _____.
- Bright lights _____ most homes at Christmas time.
- Many beautiful roses had been grown by making a _____ from one plant to another.
- The farmer raised corn on his land one year, grass another year, oats the next year, and wheat the following year. He believed in _____ of crops.
- The loganberry is a _____ between a raspberry and a blackberry.
- Nuts and candy are _____.
- The _____ from the old tree was grafted on to the new one.
- A market gardener must have a thorough knowledge of _____.
- Opals, amethysts, and many other glassy-looking stones are _____, which is found in rocks.
- Soil on the prairies grows large crops for the farmer. It is very _____.
- Mother is often praised for her _____ skill.
- The soil had a great deal of vegetable matter in it. It was rich in _____.
- Dogs and cats rarely _____ each other.

UNIT EIGHT

APPLES GALORE!



You may have seen a pile of red rosy apples in the grocery store, and above them the label "McIntosh." Have you ever wondered why they were called this? Read the story below to find the answer to this question.

Beginning Time: Hr. _____ Min. _____

THE STORY OF THE "MAC REDS"

Two men stood looking at a beautiful apple tree in blossom. The sweet fragrance of the flowers filled the air as the sun sank behind the ridge of trees. The rays of fading light etched the outlines of the two men and the tree against the sky. The quiet hush of twilight upon the land was broken only by the conversation of father and son. Minutes passed as the two talked earnestly. The old apple tree appeared almost to be a third party to their discussion as both men looked as often to the tree as to each other. There was no doubt about the topic of their conversation. They had a problem and it was the tree.

As long as the neighbours could remember, Alan McIntosh and his father had had a special interest in apples. Their farm in Dundela, Eastern Ontario, was a strip of land seven miles inland from the St. Lawrence River. As the elder Mr. McIntosh was clearing his land for crops in the early 1800's, he found several young apple trees entangled among the grasses and bushes. Years ago French settlers could have planted them hoping to duplicate the sunny orchards of France. Even though the settlers had departed, the trees had taken root and grown.

Once they were pruned, trimmed, and set out neatly on a ridge, they grew quickly. One tree in particular bore specially fine fruit. Each apple was red, hard, and shiny with white crisp meat inside. It was this tree which commanded the attention of Mr. McIntosh and his son at the close of the day.

Long after darkness set in, the earnest discussion was continued around the cheery fire in the hearth. How could they grow new apple trees that would

produce fruit like the parent tree? Time and again the men had planted seedlings from their favourite apple tree. They grew and bore fruit in due time, but the apples were never exactly like those picked from the parent tree. Alan could not hide his disappointment. The tree was old. They had to solve their problem before the tree stopped bearing fruit.

He and his father searched for the answer. During the long winter evenings they had studied books whose pages were illuminated by the flickering lights of the fire. Neighbours enjoyed the fruit from the tree but they too were unable to solve the problem. One fact was known. The answer lay in understanding how to graft branches on trees. No one knew how to do this. How were they to find out? Who could supply this information?

One spring day a drifting farm helper was hired to assist with the work. As he and Alan rested after sawing wood, their conversation turned to the apple orchard along the ridge. To Alan's amazement the helper announced that he knew how to graft trees.

The wood sawing forgotten, both men rushed to the orchard. Step by step the process of grafting little branches from the favourite McIntosh red apple tree to a young tree was explained. Again and again Alan repeated the process under the watchful eye of the farm helper to be sure the scions, as the small slips of branches from the old apple tree were called, were securely fastened in place on the young trees. The entire family watched eagerly as both root grafting and budding were learned.

Neighbours paid regular visits to the McIntosh orchard as the newly grafted branches grew. Alan himself never tired of taking them to the orchard and showing them his trees. The path from house to orchard was well worn before the first fruit appeared on the grafted branches. To everyone's delight the fruit was exactly like that of their favourite old apple tree. Now the McIntosh red apples could be grown in abundance.

Alan learned that the scions from the famous apple tree could be carried any distance if they were kept moist. Stuffing his pockets with scions he attended country fairs and went with the farmers to their own orchards, passing on the art of grafting he had learned

from the farm helper. At the same time, new markets for apples opened, as a new railway and the St. Lawrence River could both be used to bring producer and consumer together.

In the years that followed, the 1850's and the 1860's, many farmers gave their attention more and more to the orchards. Hard political problems were overcome and Confederation became a reality in Canada, but important victories, too, were won in the orchards. For hundreds of farmers in Eastern Ontario a new and profitable business had been opened for them by a man who would not rest until he had solved his problem with the apple tree.

Ending time: $\begin{matrix} \text{Hr.} & \text{Min.} & \text{Sec.} \\ \text{---} & \text{---} & \text{---} \end{matrix}$
Beginning time: $\begin{matrix} \text{---} & \text{---} & \text{---} \end{matrix}$

No. words $\frac{779}{\text{No. seconds}} \times 60 = \text{---} \text{WPM}$

GIVING REASONS FOR YOUR ANSWERS

You should be able to read quite fast now and to answer every question. See if you can correctly answer *all* of the questions below. High speed is without value unless you also make a high score in comprehension.

You will notice that most of the questions have parts to them. The first parts check on your understanding of the facts while the last part will ask you to use the facts.

1. a. Where did the McIntosh family live?

b. List three reasons why the location of the farm was important.

2. a. Describe the qualities of the McIntosh red apple which made it a favourite.

b. What was Alan's main problem with this apple?

c. Make a chart listing the people who contributed to the solution of this problem in one column, and in the second column, their contributions to the solution.

3. a. What evidence was given in the story that Alan McIntosh was a determined man?

b. List two examples of his concern and thoughtfulness for others.

c. Write three sentences describing Alan McIntosh's character.

4. a. What important political event took place in Alan's lifetime?

b. How could the country fairs assist in the solution of people's problems?

5. a. What is meant by the phrase, "in due time"?

b. Express the phrase, "at the close of day," in one or two words.

THE KING OF FRUITS



There is an old saying “an apple a day keeps the doctor away.” But apples do not grow in all parts of the world, so that in olden times some people could not obtain this fruit. Though crab apples grew wild in some areas, it was due to McIntosh and other early pioneers, interested in horticulture, that several kinds of apples were introduced into Canada. Today many apples are exported from Canada.

Read the article below to find out more about this stream of pioneers that moved westward across our country.

In studying *social studies*, it is often helpful to take notes which you can use during class discussion, in making a report, or for reviewing before a test. One good way to take notes is to jot down the topic of each paragraph, and then write under this topic the two, three, or four things which the paragraph tells you about the topic. This is what you will be asked to do in working with the paragraphs below.

The topic of a paragraph is somewhat different from the main idea. The main idea is found in the most important sentence in the paragraph. The topic of a paragraph is the subject which the entire paragraph discusses. You might think of the topic as sort of a title for the paragraph.

1. Glance through each of the paragraphs in the article below to find what topic it deals with. Write this topic as a title for the paragraph. The first one is done for you.

2. Read each paragraph carefully to find the two, three, or four important things that the paragraph tells you about that topic.

Don't try to read for speed while working with this article. You are learning a very useful study skill. Applying this skill correctly and getting the right answers are more important than trying to see how fast you can read the article.

SELLING APPLES TO THE WORLD

1. World Trade in Fruits

Commerce in fruits on a large scale has only developed since the last century. It has become one of the most important branches of national and international trade. Today, modern methods of packing and speedy transport enable fresh fruit to reach markets 5,000 miles away from the producing area, within one month after harvest. Almost every country of the world produces fruit of one kind or another, but comparatively few export it in any great quantity. Some countries export the surplus of one kind of fruit and then import the kinds they cannot produce. Canada exports apples but imports citrus fruits such as oranges, lemons, and grapefruits. In addition to fresh fruits, great quantities of processed fruit such as canned fruit, dried fruit, and wines enter world trade.

2. _____

When the Norsemen discovered North America, they named the new continent “Vineland,” because they found grapes growing everywhere. The letters and printings of the early Spanish, French, and English explorers mention many kinds of fruit found on the new continent. The apple has been cultivated for thousands of years in India and China and is now the most important tree fruit in the world. In classical and Biblical stories, apples were prized as delicacies. References are found, too, in the earliest agricultural records of European countries. The fruit that is grown in Canada today is largely dependent on plants that were introduced from other parts of the world. The introduced plants were often crossed with native species and are known as hybrids. As the original

home of the apple had a moderate climate, varieties of apples had to be developed which could withstand the cold Canadian winters.

3. _____

Though an apple tree is fairly resistant to low temperatures and has adapted to a wide range of climatic and soil conditions, most of the apples are produced in countries of temperate regions. They require a comparatively cool, long growing season, and the trees yield more and heavier fruit if the area is free from spring frosts. A fruit tree needs large quantities of water and only regions which have at least 20 inches of rainfall annually are suitable. Though fruit trees tolerate a wide range of soils, they require soil that is sweet, deep, moderately fertile, and well drained. Fruit trees have relatively wide and deep root systems which occupy the same area for many years. The texture of the sub-soil is very important for the development and growth of the root system. The ideal soil is one which never becomes waterlogged but stores a large amount of available water.

4. _____

There are four main groups of apples: dessert, culinary, cider, and crab apples. Dessert are eating apples, and these are usually sold raw, although in recent years many dessert apples have been pressed

and the juice canned. Culinary apples are those which are only suitable for cooking. Though these are sold raw, today they are often peeled, prepared, and frozen. Cider apples are too sour and bitter to be eaten, but the pressed juice is used for making a beverage or vinegar. Few cider apples are grown in Canada, but the largest part of the apple crops of Great Britain, France, and Germany consist of cider varieties. Crab apples, the original wild apples, are small and also very sour. The fruit is mainly used for making jellies and preserves.

5. _____

Commercial fruit growing in Canada is confined to rather limited areas in the provinces of Nova Scotia, New Brunswick, Quebec, Ontario, and British Columbia. In the Maritimes, apples flourish in the Annapolis valley of Nova Scotia and St. John Valley and Westmorland County in New Brunswick. The areas outside the cities of Montreal and Quebec along the North Shore of the St. Lawrence River are the most productive areas in Quebec. The Niagara peninsula has the most abundant apple orchards of Ontario although they are grown in the areas near the St. Lawrence River and the Great Lakes as far west as Georgian Bay. The Okanagan and Fraser valleys, the Kootenay and Arrow Lakes area, as well as Vancouver Island, are the regions in British Columbia where apples are prolific.



ACTIVITY 1—FINDING PLACES ON A MAP

1. a. On the map of Canada name all the cities marked with a dot.
- b. Mark the apple growing areas of Canada by draw-

ing tiny apples. Check to see that you have included all the areas mentioned in section 5 above.

- c. From which port do you think apples grown in Ontario would be shipped? Those grown in the Okanagan? Those grown in the Annapolis valley?



CONDITIONS FOR GROWING APPLE TREES

McIntosh apples now grow in many places. Apple trees grow very well in some places but not in others. Soil is very important for growth. What type of soil is good for apple growing? The article below will answer this question.

This is a *science* article. You will notice that it has headings.

In reading *science* articles with headings, it is often helpful to change each heading into a question and then read to find the answer to the question. You will be asked to do this for the following article.

1. Before reading the article as a whole, read each boldface heading, change it into a question, and write the question on the line under the printed heading. The first one is done for you.

2. Read each section of the article to find the answer or answers to the question which you wrote.

You probably will not be able to read this *science* article as fast as you read the story or the *social studies* article. But after changing the titles into questions, try reading the article as fast as you can.

Beginning Time: Hr. _____ Min. _____

THE GOOD EARTH *

We get everything we need for life from the soil, except sunshine and air. The soil provides us with food and medicines. It provides us with materials for our clothes, our homes, our vehicles, our inventions, and hundreds of other articles that we use every day. Soil is one of man's most important resources.

MANY FORCES CHANGE ROCKS TO SOIL

Changed
to a

Question: What Forces Change Rock to Soil?

Many natural forces help change rocks to soil. The breaking up of rock into pieces by natural action is called *weathering*. The natural forces at work may be gravity, wind, running water, freezing water, glaciers, and changes in temperature. Some weathering is also caused by the chemical action of oxygen, carbon dioxide, water, and other substances.

Working hand in hand with weathering are the agents of *erosion*. These agents not only break rock into pieces but also carry away these pieces. Moving air (winds), moving water (waves, currents, rivers), and moving ice (glaciers) are the chief agents of erosion. All soil has been made from rock and carried to its present location as a result of weathering and erosion over the past ages. These same forces are still at work today making soil. At the same time,

other forces are changing some soil back into rock.

CLASSIFICATIONS OF SOIL

Changed
to a

Question: _____

Because soils come from different rocks and are formed in different ways, they are bound to differ. *Sandy* soils are made up of loosely packed, large, hard grains of quartz. *Clay* soils have closely packed, small particles of smooth feldspar rock. There are many in-between kinds and mixtures of these two types. In dry, desert regions the soil is mostly the broken up parts of original rocks. In warm, moist climates the soil usually contains the decaying remains of plants and animals. This matter is called *humus*. It usually gives the soil a darker color and makes it good for plant life. If sand, clay, and humus are found mixed together, the soil is called *loam*.

Sand, clay, and loam are three common types of soil. Sandy soil does not hold water well because of its coarse texture. Because sand also contains little or no mineral matter or humus, it is not very good for growing crops. The fine texture of clay makes it hold water well, but it hardens and cracks when dry and is hard to cultivate. Clay is not very good for farming. Most loam soils are the best for farming, because they hold enough water, contain plant food, and are easy to cultivate.

* Based upon material prepared by Gordon E. Van Hooft.

GLACIAL DEPOSITS

Changed _____
to a _____
Question: _____

Much of the soil in the apple growing areas of Canada was silt originally deposited by glaciers. Apple orchards also flourish in the rich, fertile soil of river valleys or on lake shores. The soil of the Okanagan valley was the sediment from the floor of a fresh water lake which at one time covered this area. The fine soil particles which have been deposited by flowing water is called alluvium. Alluvial soil contains minerals such as lime, phosphates, and potash, which are essential for plant life. It also allows free movement of air and water and penetration by roots.

CONSERVING SOIL

Changed _____
to a _____
Question: _____

It is estimated that the average depth of topsoil on

Ending time: _____
Beginning time: _____

this continent was 9 inches when the country was settled by white men. Now it is estimated that the average depth is only 6 inches. Since it takes centuries to make one inch of topsoil, it is important that steps be taken to conserve the soil.

Scientists have found several ways of helping to conserve the soil. Erosion by wind and running water carries good soil away. This can be prevented by planting rows of trees for windbreaks. It can also be prevented by plowing around hills rather than up and down them. Planting forests and cover crops that absorb rain and hold the soil together also prevents erosion.

Poor soils which need certain minerals can be improved, also. Fertilizers can be used to supply these minerals. Rotation of crops also improves poor soil. Crop rotation means planting a different crop in a field each year for several years. If the same crop is planted year after year, it takes the same minerals from the soil. Another crop planted in the same field may do very well because the soil may still have the minerals that this crop needs.

No. words $\frac{727}{\text{No. seconds}} \times 60 = \text{WPM}$

How did your rate in reading this *science* article compare with your rate in reading the *social studies* article on pages 90-91? _____ How did it compare with your rate for the story on page 100? _____

ACTIVITY 1-ANSWERING QUESTIONS

- Write your answers to these questions:
- 1. Why did McIntosh's trees grow so well in Ontario?

 - 2. The average depth of topsoil in our country when first settled was _____. How much is it now?

ACTIVITY 2-RECALLING FORCES

- What forces change rock to soil? Finish the outline below. Name seven forces that cause weathering, three that cause erosion.
- A. Weathering
 - 1. Natural forces: _____
 - 2. Chemical forces: _____
 - B. Erosion: _____

ACTIVITY 3-CLASSIFYING SOILS

Fill in the outline below. Under the heading *Soil* give the names of three kinds of soil. Under each of the other headings write one or two words telling what makes each kind of soil different from the others.

Soil	What Made of	Texture	Water-Holding
1.			
2.			
3.			

Comprehension score _____ Speed: _____WPM

On the pages of *mathematics* books you find many directions that tell you what to do. You must read *every* word in these directions and follow them *exactly*, otherwise you cannot get the correct answers to the problems. In such problems, a great deal depends upon your *reading*.

You will now be given practice in reading directions in connection with *arithmetic* problems. In reading these directions do these things:

1. Read just one direction at a time, *very* carefully.
2. Think about that direction and be *sure* that you know exactly what it tells you to do.
3. If you are not absolutely sure about what you are to do, read the direction again to straighten out any part of it that isn't clear to you.
4. Carry out the direction *exactly* as you are told.

PROBLEMS ABOUT ALAN MCINTOSH



FINDING DISTANCES ON A MAP

This map of Ontario shows some of the places which Alan McIntosh may have visited, although the cities were not as we know them now. The McIntosh farm was very close to Cornwall. Each $\frac{1}{16}$ inch on the map represents 5 miles ($\frac{1}{16}'' = 5 \text{ miles}$).

1. Use your ruler to find how many $\frac{1}{16}$'s of an inch there are between Prescott and Brockville. Approximately how many miles does this represent?

- a. What are you to use in measuring? _____
- b. Between what towns are you going to measure distance? _____ and _____
- c. What are you going to find? _____

- d. What does the question at the end of the problem ask you? _____

- e. What process will you use in finding the answer? _____

- f. What is your answer? _____

Read the additional problems below just as carefully as you read No. 1.

2. Find Ottawa. Find Cornwall. Measure to find how many $\frac{1}{16}$'s of an inch there are between Ottawa and Cornwall. How many miles would Alan travel in going from Cornwall to Ottawa?

Answer: _____

3. Find Kingston. Find Peterborough. Find Toronto. Measure to find the distance in sixteenths of an inch from Kingston to Peterborough to Toronto. Approximately how many miles would Alan travel in going from Kingston to Peterborough to Toronto.

You will use two processes in getting the answer to this problem.

- a. What process will you use first? _____
- b. What will you use next? _____

Answer: _____

4. Find the city closest to the McIntosh Farm. Measure the distance from Renfrew to Alan's home in lengths of $\frac{1}{16}$ of an inch each. Approximately how many miles is it from Renfrew to this other city?

Answer: _____

SKETCHING A PLOT FOR APPLE TREES

It will be necessary for you to read carefully the directions below in order to sketch a nursery plot for apple trees. In reading these directions, you will find both directions and questions mixed together. You often find this mixture of directions and questions in *mathematics* books. One minute you are reading to follow a direction, and the next minute you are reading to answer. You read differently for each of these purposes.

In reading these directions and questions, work with each direction in the same way that you did in measuring distances on the map.

When you come to a question mixed in with these directions, read the question just as carefully as you read the last direction. *Think* about the question. Make sure that you know what it asks of you. Then find the answer.

1. In one of his apple nurseries, McIntosh planted seeds in 15 straight rows, 2 feet apart. In each row, he planted seeds for 25 trees, spaced 2 feet apart. Make a sketch of this plot.
 - a. Draw a rectangle $3\frac{1}{2}$ by 6 inches.
 - b. Mark off the spacing of the 15 rows on one of the shorter sides of the rectangle. Use $\frac{1}{4}$ inch to represent each space of 2 feet.
 - c. Draw lines across the rectangle to represent the rows of trees.
 - d. Write "Rows" along one of the short sides of the rectangle.
 - e. Mark off spaces on one of the long sides of the rectangle to show where seeds were planted in each row for the 25 trees spaced 2 feet apart. Use $\frac{1}{4}$ inch for each 2 feet.
 - f. Draw lines from your markings across the rectangle to show where the 25 trees were planted in the rows.
 - g. Write "Trees" along one of the long sides of your rectangle.
 - h. Place a dot at each intersection of two lines to represent a tree. Does this help you to see the orchard that Alan planted?
 - i. If there were 15 rows 2 feet apart, how wide was the orchard? _____
 - j. If there were 25 trees 2 feet apart in each row, how long was the orchard? _____
 - k. How many square feet were there in the orchard? _____
 - l. How many square yards were there in this plot?
 - m. What is the name of the kind of rectangle that you drew? _____

HOW TO FIND THINGS IN DICTIONARIES AND ENCYCLOPEDIAS

Textbooks are excellent these days, and they contain a great deal of information. But there are many things that you need to and want to look up outside of your textbooks. And there will be more and more things that you will want to look up as you go through high school. You have already had some practice in using the study skills that are necessary for locating information. You now need to improve and perfect these skills, so that you can use them easily and rapidly.

You will be given some practice below that should help you in improving these skills.

Improving Your Dictionary Skills

Finding a letter *quickly* in the alphabetical index of a dictionary is your first important dictionary skill. Follow the directions and answer the questions below to get more practice in this skill.

1. Write the letters of the alphabet in order:

2. How many letters are there in the alphabet? _____
3. If the alphabet were divided in half, which letters would be in the first half?

Making use of the Guide Words at the top of a page in a dictionary or encyclopedia is another important skill. Instead of turning page after page in the section of I's to find *loam*, you simply look at the top of the page, where the Guide Words might be Lizzie—Loan. You know that the beginning letters of *loam* are loa and that the last letter m comes before n as in *loan*. So, you decide at once that *loam* is on this page, and you find it quickly.

Here are some Guide Words that are at the top of certain pages in a dictionary.

Page 204: Bagatine—Bail

Page 1502: Mare—Marialite

Page 1926: Position—Possession

Page 2852: Vitaglass—Vitrification

4. Underline the words in this list that you would find on page 204: baboon, baby, bagpipe, baffle, bait, baggy, bacteria, bald, Bahama, bucket
5. Underline words in this list that you would find on page 1502: maple, margarine, manage, magnet, margay, margin, manganese, manor, machine
6. Underline the words in this list that you would find on page 1926: positive, port, pore, pollen, possess, pressure, posse, porcelain, profess
7. Underline the words in this list that you would find on page 2852: vision, vitamin, vinegar, vital, vest, van, vitreous, vein, volcano

Improving Your Encyclopedia Skills

An encyclopedia is a set of volumes in which you can find reliable information on almost any topic. The volumes are numbered in order. Each volume has a letter or letters on its shelf-back to tell you that words beginning with that letter or those letters will be found in that particular volume. Words beginning with A would be found in Volume 1, words beginning with T, U, or V would be found in Volume 14. When looking up people, you look for their last names rather than their first names. It is important that you be able to choose *quickly* the right volume for any topic.

See how quickly you can find the right volume for each of the topics below. Write the number of the volume in which you think the topic would be discussed in the space to the right of each topic.

- | | |
|-------------------------|------------------------|
| a. soil _____ | b. England _____ |
| c. forests _____ | d. diet _____ |
| e. shells _____ | f. navigation _____ |
| g. fish _____ | h. oranges _____ |
| i. zinc _____ | j. weather _____ |
| k. soap _____ | l. boats _____ |
| m. Robert Gourlay _____ | n. Alan McIntosh _____ |



HOW TO FIND THINGS IN A LIBRARY

High school and college students have to do the larger part of their reading and study in a library. It is a pleasure to work in a library if you can find what you want easily and quickly. Many students, however, waste much time hunting for what they want. Sometimes they leave the library without even finding what they want, let alone reading it.

Using a Card Catalog

The first library skill that you should improve as fast as you can is that of quickly finding the right drawer in a card catalog.

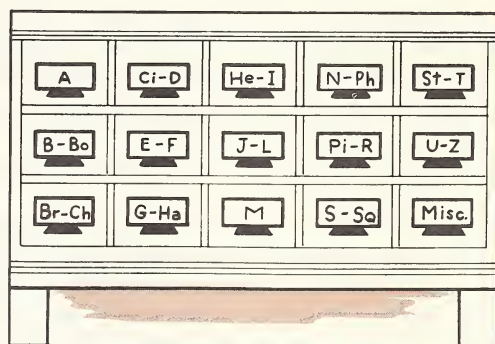
You might think of a card catalog as a huge encyclopedia, each drawer representing a volume. Instead of containing pages, however, each drawer contains cards. Instead of giving you the information itself, the cards tell you in what book you can find the information.

The letter or letters on each of the drawers in the diagram below tell you in which drawer you can find cards with names of authors, books, or topics beginning with the letter or letters shown.

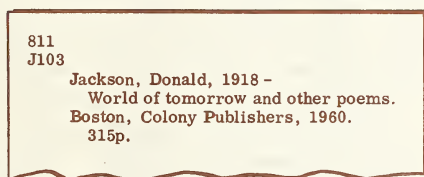
If you wish to find the names of some books on the topic of *atoms*, you would of course look in the A drawer. If you wish to look up the names of books on *opossums*, you would look in the drawer marked *N-Ph* because the letter *O* comes between *N* and *P*, and so cards representing that letter would be included in the *N-Ph* drawer.

Write the letter or letters of the drawer in which you would find cards having to do with each of the topics or persons below. Remember that you look for the *last* name when you are searching through a card catalog for the name of a person.

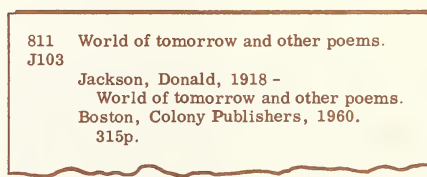
- | | |
|--------------------------|-------------------------|
| a. lumber _____ | b. desert _____ |
| c. conservation _____ | d. furs _____ |
| e. Panama _____ | f. glaciers _____ |
| g. humus _____ | h. weather _____ |
| i. sugar _____ | j. Robert Gourlay _____ |
| k. W. L. Mackenzie _____ | l. John Simcoe _____ |
| m. Alan McIntosh _____ | |



Reading Cards in the Card Catalog



Author Card



Title Card

There are two or more cards for each library book—an *author* card, a *title* card, and sometimes a *subject* card.

If you know the title you wish, look under that title to find whether the book is in the library. If you do not know the title, but know the author's name, look under the author's last name. If you do not know either the author or title, but do know that you wish a book about a specific subject, look under the name of the subject—for example, *Poetry*.

Write information as it would appear on a title card for this book:

Turncoats, Traitors, and Heroes, by John Bakeless, published in New York by Morrow and Company in 1955. Library number: 973.385.

Now write information as it would appear on an author card for this book:

Turncoats, Traitors, and Heroes, by John Bakeless, published in New York by Morrow and Company in 1955. Library number: 973.385.

DRAWING CONCLUSIONS

Below are several different sets of facts. Study each set carefully. Then see if you can draw a conclusion based on the facts. Write your conclusions on the lines beneath each set of facts.

1. There were no native rabbits in Australia. About 100 years ago a man brought some rabbits to Australia from London. He let them loose on his farm where he hoped to hunt rabbits. These rabbits multiplied very fast because none of their natural enemies, such as foxes and owls, lived in Australia. Nor were there any rabbit diseases in Australia.

a. What was the result? _____

2. Get a small geranium or other plant. Color a panful of water by dissolving some vegetable dye in it. Water the plant with this colored water for two or three days. After several days, cut the stem of the plant in three or four places. You will find that the dye has moved all through the plant. Place a white carnation in a bottle of red ink. In a few hours you will have a red carnation. Place a stalk of celery in black ink. In a short time you will have black celery.

The soil contains minerals. Many of these minerals are dissolved in the water which is in the soil. You have read a paragraph telling what happens to a plant when it is watered by colored water or placed in colored ink. What do you think happens to the dissolved minerals in water taken up by plant roots? Write your conclusion _____

3. Dr. Lind was a ship's doctor on an English boat. Many of the sailors were ill with scurvy. Dr. Lind thought their food might have something to do with it. He paired off the sick sailors and gave each pair a different medicine or food each day. He gave pepper and oil to two of the men, cream of tartar to another pair, cider to another pair. To a fourth pair he gave the juice of oranges, lemons, and limes. There was another pair to whom he gave no medicine or special food.

Within a few days the two men who had been fed fruit juices were better. None of the other men was any better. Dr. Lind repeated the experiment several times with the same results.

What conclusion do you think Dr. Lind drew from his experiment? _____

4. One class of insects has mouth parts that bite and chew. This class of insects gets its food by biting and chewing the leaves of plants. Another class of insects sucks its food, because these insects have long, hollow tubes as mouth parts. These insects live on the juices of plants or the blood of animals.

Cows have teeth good for biting and chewing. The digestive system of cows can use plants but not meat. Cows therefore eat plants. Cows use their teeth to bite off grass. They swallow the grass into the first of their two stomachs without chewing it. Later, while resting, they bring the grass back into their mouths in small amounts and chew it. When they swallow the chewed grass it goes into the second stomach.

Think about the several animals mentioned above, the kind of food each one eats, and how it gets this food. Then answer this question: What is there about an animal that often decides

what kind of food it will eat? _____

5. A prison doctor in the West Indies made an important discovery. The prisoners in his prison were ill. They could not walk. As he looked outside the window he noticed that the prison chickens were ill, too. They couldn't walk either. Chickens outside the prison yard were well.

The doctor kept wondering about this strange disease of men and chickens. He knew that the prison chickens were fed scraps from the table. They were getting the same food as the prisoners. This food was mainly polished rice. The chickens outside the prison ate whole grain. The doctor began feeding the prison chickens the husks that were taken from the brown rice when the cook polished it. The chickens got well. He then began feeding whole brown rice to the prisoners. They, too, got well.

The doctor drew a conclusion as a result of this experiment. What do you think the conclusion was? _____

WORKING WITH WORDS OPPOSITE IN MEANING

Below you will find two lists of words. To the right of each word there is a line. On this line you are to write a word which is opposite or nearly opposite in meaning to the printed word at the left. You will find the correct word to write on each line in the list at the bottom of the page.

The word that is opposite in meaning to the first word has been written for you.

- | | |
|-------------------------|---------------------|
| 1. exit <u>entrance</u> | 19. vertical _____ |
| 2. fertile _____ | 20. real _____ |
| 3. crude _____ | 21. coarse _____ |
| 4. succeed _____ | 22. bold _____ |
| 5. stern _____ | 23. latitude _____ |
| 6. clumsy _____ | 24. expensive _____ |
| 7. rude _____ | 25. calm _____ |
| 8. moist _____ | 26. conserve _____ |
| 9. confusion _____ | 27. gradual _____ |
| 10. entire _____ | 28. swift _____ |
| 11. attic _____ | 29. admit _____ |
| 12. narrow _____ | 30. strange _____ |
| 13. separate _____ | 31. victory _____ |
| 14. morning _____ | 32. powerful _____ |
| 15. correct _____ | 33. fresh _____ |
| 16. stupid _____ | 34. increase _____ |
| 17. difficult _____ | 35. opposite _____ |
| 18. complex _____ | 36. unite _____ |

timid
fail
waste
fine
longitude
wrong
familiar
polite
together

partial
entrance
mild
stale
order
false
graceful
easy
divide

smart
horizontal
barren
cellar
slow
weak
decrease
alike
simple

evening
steep
deny
cheap
dry
refined
wide
disturbed
defeat

WORKING WITH WORDS HAVING SIMILAR MEANINGS

In each of the groups below there is one word and three spaces on which additional words may be written. The additional words for each group are to be words which have meanings somewhat like the key word which has already been printed on the first line in each group.

Choose the three additional words for each group from the lists at the bottom of the page.

1. ancestor _____

2. main _____

3. route _____

4. collect _____

5. hesitate _____

6. admire _____

7. wander _____

8. mass _____

9. force _____

10. serve _____

11. fertile _____

12. urge _____

13. difficult _____

14. original _____

gather

path

grandfather

principal

help

heap

falter

forbear

persuade

aid

power

accumulate

hard

assemble

fruitful

linger

chief

productive

bulk

stimulate

energy

stray

assist

rich

forefather

pause

ramble

first

respect

esteem

roam

lump

primary

plead

first

strength

road

trying

native

toilsome

approve

way

WORKING WITH SOCIAL STUDIES WORDS

The words below appear in the most widely used *social studies*, *history*, and *geography* books at your school level. You will be able to get your lessons in these subjects better if you know the meanings and pronunciations of these words. Perhaps you think that you can already pronounce each one correctly, and that you know the special meaning of each word as it is used in these subjects. Check with the pronunciations and meanings below to be sure.

Study the pronunciation of each word. Say the word to yourself. Then read and think about its meaning.

allies
ă lîz' In *social studies*, usually a group of nations united in a common interest, as in warfare.

civilization
sîv'î lî ză'shŭn A state of social culture shown by progress in art, science, and government; the rules and customs of education and refinement, as opposed to savagery.

conquer
kŏng'kêr To gain by force of arms.

conquest
kŏng'kwêst Act of gaining something as the result of a struggle.

corporation
kŏr'pŏ ră'shŭn A united body of people usually bound by a legal act; a group of people authorized to act as a single person.

declaration
dêk'lă ră'shŭn The act of proclaiming publicly.

fertilizer
fûr'tî lîz'êr A material which is used to enrich the soil and make it more productive.

government
gŭv'êrn mên't The rules, regulations, and political body of people which govern a country.

interior
în tîr'î êr Inland; the inside of a country.

location
lŏ kă'shŭn Place or position of something.

primitive
prîm'î tîv Beginning; earliest time.

region
rê'jŭn In *social studies*, usually a large tract of land.

social
sŏ'shăł Having to do with the welfare of human beings as they work or play together; having to do with human relationships in general. That which is spent, taken, or enjoyed in the company of one's friends.

See how well you understand the meaning of each of the words you have been studying. Select one word to write in each of the spaces below.

1. Many of the people who conduct our affairs of _____ stay in Ottawa.
2. Everyone in the town went to the picnic as one _____ group.
3. There is a great _____ at the South Pole in which no one lives.
4. In the early nineteenth century, Napoleon tried to _____ Russia.
5. Thousands of years passed before the early savages reached a state of _____.
6. The French were our _____ in World War II.
7. The earliest human beings on earth were _____ people.
8. The prisoners announced publicly that they were not guilty. They made a _____ of their innocence.
9. It was a long time after the Colonists arrived before people settled in the _____ of our country.
10. The company is run by a group of people bound by a legal act. It is a _____.
11. When Edmund Hillary climbed Mount Everest, it was a great _____.
12. The early settlers who went West tried to find a _____ near a waterfall.
13. Many years ago the soil in our country was very rich. Farmers did not find it necessary to use a _____.

âte, ât, câre, ârt, pâth, vâcation, âbound, înfânt; bê, mêt, hêr, hêre, ênough, silênt; îce, ît, Aprîl; ôld, nôtt, ôr, ôbey, sôft, cŏnnect, fŏod, fŏot; cûbe, cût, bûrn, menü (French), ûnite, circûs.

WORKING WITH MATHEMATICS WORDS

The words below are found in *mathematics* textbooks at your level. You will be able to get your *mathematics* lessons better if you can pronounce each of these words correctly and if you know what each one means as it is used in *mathematics*.

Perhaps you think you know several of these words already. Check carefully anyhow to make sure.

Study the pronunciation of each of these words. Say the word to yourself. Then read the meaning of the word carefully, and think about it.

angle ăng'g'l	When two straight lines meet, they form an <i>angle</i> .
sides sīdz	The two lines which form an angle are called the <i>sides</i> .
vertex vûr'teks	The point at which two angles meet is called the <i>vertex</i> .
arc ărk	A part of a curved line.
radius ră'di ũs	The distance from the center of a circle to any point in its circumference. <i>Radii</i> is the plural of <i>radius</i> .
radii ră'di i	
sector sĕk'tēr	The part of a circle bounded by an arc and two radii.
horizontal line hŏr'ĩ zŏn'tăl	A line parallel to the horizon; a line perfectly level in position.
vertical line vûr'ti kăl	A line which extends straight up and down.
oblique line ŏb lek'	A line which is neither vertical nor horizontal.
perpendicular pûr'pĕn dik'ŭ lĕr	When two lines meet in such a way as to form a square corner, each line is " <i>perpendicular</i> " to the other.
square skwâr	A four-sided figure in which all sides are equal in length.
triangle tri'ăng'g'l	A three-sided figure of which the sides may or may not be equal.
parallelogram pă'ră lĕl'ŏ grăm	A four-sided figure of which both pairs of opposite sides are parallel.
trapezoid trăp'ĕ zoid	A four-sided figure of which only two sides are parallel.
hexagon hĕk'să gŏn	A plane figure with six sides.
polygon pŏl'i gŏn	Any plane figure enclosed by straight lines, regardless of the number. It may be of any shape.
perimeter pĕ rĩm'ĕ tĕr	The distance around any figure bounded by straight lines.
equivalent ĕ kwĩv'ă lĕnt	Equal in length, size, value, or amount.

See how well you know the meanings of the words. Write or draw answers to the exercises below.

1. A figure with four equal sides is a _____.
2. The two circles were the same size. They were _____.
3. Jane measured the distance around the rectangle. She found its _____.
4. A plane figure that has six sides is known as a _____.
5. Draw a horizontal line:
6. Draw a vertical line:
7. Draw an oblique line:
8. Draw two lines that are perpendicular to each other:
9. Draw a parallelogram:
10. Draw a square:
11. Draw a triangle:
12. Draw two polygons:
13. Draw a trapezoid:
14. Draw an angle. Label the vertex and the sides:
15. Draw a circle. Make a sector in it. Label the arc, the sector, and one of the radii.

ăte, ât, câre, ârt, păth, văcation, ăbound, infănt; bĕ, mĕt, hĕr, hĕre, ĕnough, silĕnt; ĭce, ĭt, Aprĭl; ŏld, nŏt, ôr, ôbey, sŏft, cŏnnect, fŏod, fŏot; cŭbe, cŭt, bŭrn, menŭ (French), ũnite, circŭs.

WORKING WITH NEW WORDS WHICH YOU WILL MEET IN UNIT NINE

The words below are in Unit Nine, which you will soon read. You will be able to read this next unit more rapidly and will understand it better if you know the pronunciation and meaning of each of these words. The meaning given for each word is the meaning with which it is used in Unit Nine.

Study the pronunciation of each word. Say the word to yourself, using the markings to guide you in its pronunciation. Read the meaning of the word and think about it.

bicarbonate bī kār'bōn āt	An acid containing carbon. Bicarbonate of soda contains carbon and soda.
breechclout brēch'klout'	A cloth worn for breeches around the lower part of the body.
bronze brōnz	A metal made from a mixture of copper and tin.
burin būr'īn	A tool made of flint by Stone Age men. It was something like a chisel made of stone.
canteen kān tēn'	A small vessel used by workmen or soldiers for carrying water.
character kār'āk tēr	One of the persons in a story, drama, or novel.
gourd gōrd	The fruit of a plant. It has a hard outer shell when dried.
kindling kīn'dling	Something to use in starting a fire; <i>kindling point</i> is the point at which a substance will burn.
mammoth mām'ūth	A huge elephant which lived in early ages. Its remains have been found in Alaska and Siberia.
mescal mēs kāl'	A small cactus which grows in deserts in the western part of the country.
Otah ō'tā	The name of a boy in a story which you will read in the next unit.
religion rē lij'ūn	The worship of God, or of a god; one of the systems of worship; awareness that there is a supreme being.
sandal sān'dāl	A kind of shoe made of a sole strapped to the foot.
smelting smēlt'ing	Melting and fusing metals.
tetrachloride tēt'rā klō'rīd	A compound made of some element and four atoms of chloride.
torch tōrch	A flaming light usually carried in the hand.
tunnel tūn'əl	A horizontal passage open at both ends to provide a path or road; often under a river or through a mountain.

See how well you know the meaning of the words with which you have been working. Choose one word to write in each of the blank spaces in the sentences below. Add *s* if necessary.

- The firewood burst into flame. It had reached the _____ point.
- Early people used a tool made of stone which was called a _____.
- Tom went into a steel foundry and saw them _____ iron.
- Trains often travel through a _____ under a mountain.
- The soldier carried water in his _____.
- Nathaniel was a _____ in one of the stories you read.
- It was dark in the cave so the men carried a _____.
- Men in the early days mixed copper and tin together to make _____.
- Early settlers in the Midwest often used a dipper made from the hard outer shell of a plant called the _____.
- Barbara had a very comfortable kind of shoe. It was little more than a sole tied to her foot. It was a _____.
- When carbon is combined with soda, it makes _____ of soda.
- Men who live in a hot climate sometimes wear _____ instead of pants.
- Some primitive peoples worshipped the sun as a god. That was their _____.
- While John was travelling through the desert, he saw a _____ plant.
- When an element is combined with four atoms of chloride it is called a _____.
- Ann saw the skeleton of a huge elephant that lived in early times. It was a _____.
- The boy character in the next story that you will read is named _____.

UNIT NINE

IN BEGINNING DAYS



The story below has its setting in an ancient salt mine. It was used about 1000 years ago. The background information in the story is true, but Otah and his father are, of course, imaginary characters.

Read the story for enjoyment. Try to think of yourself as being with Otah in the salt mine and walking by his side as he went to the mine and came home from it. Put yourself into this story along with Otah and live through it as if you were really mining salt in the early days.

This is the last story in the book, and you should read it much more rapidly than you read the timed story on pages 46-47. Move your eyes rapidly over the lines, taking in large groups of words at each glance.

Beginning Time: Hr. _____ Min. _____

OTAH MINES FOR SALT *

"Are you ready, my son?" asked Otah's father. "It is time to start."

"Yes, Father," Otah said. The men were going to the salt mine. For years Otah had longed to go with them, and now, at last, he was old enough.

Although only thirteen years old, he was as tall as the men. They were short with broad shoulders and brown skins like other Indians. They wore breech-clouts of cotton cloth and sandals woven from the fiber of a plant. Headbands kept their bobbed hair out of their keen black eyes.

Otah's father carried a deerskin sack and a canteen made from a gourd. The others carried canteens, too, and hemp bags filled with food, and armloads of torches made of sticks and bark tied together in long, slender bundles.

The trail to the salt mine began at the village in which the Indians lived. For a while the path followed a river. "Fill your canteen, my son," Otah's father said. "You will want many drinks today."

Soon the trail left the river and wound through a barren countryside, now called "badlands." Otah's father pointed to two rounded hills. "There is salt in

those hills," he said, "but it does not belong to our clan. We get our salt from a cave which the Old Gods left us when the world was new."

At last the trail left the valley and climbed to a hole in a cliff. Otah's father made a fire and said one prayer to the Old Gods and another to the Father-Sun. Then, lighting their torches, they went into the hole and started crawling through a long tunnel that went back into the cliff. Climbing the ladder at the end, they soon stood in a cave, seventy-five feet long and forty feet wide.

Inside Otah saw hundreds of round pits where lumps of rocky salt had been hacked from the walls. The floor was covered with dust and lumps of salt. Scattered about were bits of burned torches, several worn-out sandals, and broken pieces of canteens. These gave proof that people had been coming to this cave many years.

A pile of stone picks lay beside a fallen rock. Each miner took a pick and a stone hammer and a lighted torch. Then he started pecking a round groove into the rock salt sides of the cave. Otah watched for a moment, then he, too, started pecking at the rock salt. Peck-peck, went Otah's pick till the groove was so deep that a lump was left inside. He loosened it with a sidewise blow of his hammer. Throwing the loosened

* Adapted from a story prepared for this book by Carroll Tarre Fenton.

lump on a deerskin in the middle of the cave, he began pecking out another ring.

Otah grew very tired, but he did not stop to rest. He wanted to prove that he was as good a miner as the others. The burning torches smoked, making the air stuffy. Salt dust got into Otah's eyes, nose, and mouth. He took several sips from his canteen, but kept right on working. His father handed him some pieces of mescal plant. "Chew these, my son," he said. "Then you will not be so thirsty." Otah gratefully chewed the sweet mescal. Not only did it stop his thirst, but it covered the taste of salt.

After working several hours, the miners stopped to eat their lunch. They had dried meat, cakes of ground-up beans, and green corn which they roasted in a fire built in the cave. After eating they threw away the corncobs, then went back to work.

	Hr.	Min.	Sec.
Ending time:	_____	_____	_____
Beginning time:	_____	_____	_____

At last Otah's father gave the sign to stop. Again he prayed to the Old Gods. Then the men loaded their sacks with lumps of salt, threw them over their shoulders, and climbed down to the tunnel.

The sun was setting as they reached the opening. Blinking their eyes and spitting the salt from their mouths, they drank the last of their water.

Otah walked beside the others the six miles back to their village where food and rest awaited them. He was proud to have taken part in something of such importance to his people. They needed salt for their food and had mined enough to last for many days. And, perhaps, some of the very salt he carried would be used to trade with other Indians living west and south of their village. These Indians had bright-colored feathers and shells brought from the distant ocean. Otah's people liked these trinkets.

No. words	770	
No. seconds	_____	$\times 60 =$ _____ WPM

COMPREHENSION QUESTIONS

Write your answers to these questions:

1. Where did people obtain salt in ancient times?

2. What did the miners wear?

3. Why didn't the men stop to get salt from the two hills that they passed on the trail?

4. How did the men light the cave?

5. What proved that men had used the mine before?

6. What tools were used in mining the salt?

7. What did Otah do with a lump of salt when he had pecked it loose from the side of the cave?

8. What made him uncomfortable as he worked?

9. What did his father give Otah to quench his thirst?

10. They would use some of the salt with their food. What else might they do with it?

Comprehension score: _____ Speed: _____ WPM

DISCUSSION QUESTIONS

Write your answers to these questions on a separate piece of paper.

1. Would you have wanted to go with the miners if you had been Otah? Why?
2. Why did Otah's father think that Otah would need many drinks of water during the day?
3. Why did Otah watch the others for a moment before he began pecking salt?
4. Compare the men's lunch with the selection on pages 92-93. Did they have some of each of the five kinds of food? Since they were unable to get sea food, which mineral did they probably need?
5. People today can get salt at a store. If they couldn't get salt easily, do you think they would go to as much trouble as Otah's people did to get it? Why?

How does your comprehension and rate in reading this story compare with the scores you made in reading the story on pages 46-47?

You can keep on improving both your rate and comprehension in reading stories. Time yourself when reading stories in *literature* and in magazines, then try to tell yourself what you have read. Try to read each story faster than the last one. You can't read too fast as long as you enjoy the story and understand what you are reading about. The faster you read, the more reading you can do. So keep on practicing!

THE AGES OF MAN



There are five ages of progress in man's civilization. To which one did Ota belong? You will find out as you read the article below.

Do these things in working with this article:

1. The pictures above show men who represent each of these ages. "Read" these pictures and see if you find one thing that happened during the age in which each man lived.
2. Now read the boldface headings. Change each one into a question in your mind, but don't write it. Your questions may be something like these: "When did primitive man appear?" "What happened in the Old Stone Age?"
3. Time yourself as you read the entire article, covering the lines as fast as you can but still finding the answers to your questions.

Beginning time: Hr. ____ Min. ____

MAN'S PROGRESS THROUGH THE AGES *

Scientists classify the Ages of Man according to the materials used for tools. At a single time, different groups of people may be living in the Age of Iron, while other peoples are living in the Old Stone Age, the New Stone Age, or the Age of Bronze. The dates given in the selection are the dates at which our own ancestors developed the various tools that have created our modern way of living.

PRIMITIVE MAN

No one knows how long men may have been on earth before tools were invented. Scientists guess that the first man may have appeared on earth 1,000,000 years ago. The oldest human bones have been found in Java, Europe, South Africa, and China. These bones are much less than 1,000,000 years old.

THE OLD STONE AGE

The oldest tools that scientists have found are chipped stones thought to be 500,000 years ago. Scientists thus date the beginning of the Old Stone Age at 500,000 years ago. The earth is thought to have grown colder at that time. Perhaps man learned to make tools because he could no longer live so easily

in the changed climate. In any event, man's need for food and protection caused him to make tools and weapons, such as the hand ax, of flint and quartz. With the discovery of fire, he began to cook, to warm his cave home, and to protect himself from animals.

The invention of the burin, a kind of chisel made of stone, made it possible for man to live even in very cold regions. With the burin, he could make weapons from bone and ivory. These new weapons were larger and less breakable than those made of flint. With them, man could hunt not only mammoths, horses, and reindeer, but also large sea mammals found in northern climates. With bone needles, Old Stone Age men could make clothes and tents from animal's hides.

Old Stone Age men could also weave baskets, make pottery, draw, paint, and carve. Some lived in huts and small settlements. Religion may have begun.

THE NEW STONE AGE

The New Stone Age began about 6,000 B.C., when Old Stone Age Man learned to grind and polish his tools and weapons. Soon stone axes were made which could cut like steel. Trees were chopped down to build houses. The hunter became the herdsman, as he farmed and herded animals. This led to village life and the beginning of government, under the

leadership of a chief. The farmer is always interested in the weather, so man began praying for rain and sun. Thus, some say, a form of religion was born.

THE AGE OF BRONZE

The next age started in about the year 3,000 B.C. Then man began hunting for a material that would be easier to shape and polish than stone. With the finding of copper, tin, gold, and silver, the Age of Metals began. At first man used these metals to make tools like his old stone ones. Later, however, he discovered the secret of smelting, which made it possible to combine tin and copper into bronze. Bronze is harder than either metal alone, and thus better. So much bronze was used by carpenters, jewelers, and soldiers from the years 3,000 B.C. to 1,000 B.C. that this period

is called the Age of Bronze. This age, too, saw the beginning of writing, making coins, building ships, and using the wheel.

THE IRON AGE

Following the Bronze Age came the Iron Age. After man discovered smelting, it was easy to find and use iron. Iron was smelted and shaped by heating and hammering it over a charcoal fire. Ironworking began, as had the working of copper and bronze, in Asia Minor. It spread rapidly, because iron is so very common. About 4 per cent of the earth's surface is iron. It was cheaper than other metals, so farmers, herdsmen, carpenters, and soldiers everywhere began using it. Although it began over 3,000 years ago, the Age of Iron is with us today.

Hr. Min. Sec.

Ending time: ___ ___ ___ No. words 660
Beginning time: ___ ___ ___ No. seconds ___ × 60 = ___ WPM

Did you read this *social studies* article faster than you read the one in Unit Seven?
Continue to practice rapid reading when working with your *social studies* books. But never read so fast that you cannot get the thought.

COMPREHENSION QUESTIONS

Check the right answer:

- 1. Otah's people used tools of stone, they lived in a village, and they raised crops for much of their food. In what age did Otah live?
a. Iron Age b. New Stone Age c. Age of Bronze
- 2. Scientists classify the Ages of Man according to:
a. paintings and religions b. dates c. materials used for tools
- 3. One place in which very old human bones have been found is:
a. South America b. North Africa c. China
- 4. An invention that made it possible for Old Stone Age men to live in cold countries was:
a. smelting b. the burin c. painting

- 5. Old Stone Age men learned to:
a. write b. use numbers c. make paintings
- 6. New Stone Age men became:
a. manufacturers b. herdsmen c. traders
- 7. The Age of Bronze began when men started working with:
a. wood b. ivory c. metals
- 8. During the Age of Bronze, men began to:
a. use electricity b. write c. draw pictures
- 9. It was easy for man to use iron after he discovered:
a. smelting b. fire c. pottery
- 10. The Iron Age:
a. ended in 6000 B.C. b. ended in 1000 B.C.
c. is still with us.

Comprehension score: _____ Speed: _____ WPM

Working with a History Time Line

Get a separate piece of paper. Draw a line down the left side of the paper. Think of this as a continuous line of time running from the beginning of civilization to the present. Write the dates of the different ages and the name of each age at the right places in the time line. Then list the important events under each age.

Ask your teacher to give you additional help in making this time line.

Applying What You Have Learned About Reading History

When studying a chapter that has many dates and events in it, you will find it helpful to work out a time line such as the one just shown. If the dates and events are arranged in order in one stream of time, you can see their relationships and how each one leads to the next one. This will help you in remembering the important information in an entire chapter.

THE NATURE OF FIRE



The *science* article below is not a classification article, nor is it a problem-solving article. The part under the heading "What Makes Fire Burn?" gives you facts that scientists have found out about fire. Usually when a heading in a *science* book starts out with *what*, you may expect to find a list of facts. This is true in the article that follows. When you read this part of the article, read to find the list of facts.

Both of the other headings begin with *how*. This tells that you are about to read an explanation of how you or someone or something can do a certain thing. Along with such explanations in *science* you are usually told *why* the things discussed work as they do. You are given reasons. In reading the parts under the last two headings, you will find the word *because* often. Whenever you come to this word you may be sure that a reason is going to be given. Look for these reasons.

See how fast you can read this article and still understand all that it says.

FACTS ABOUT FIRE*

Beginning time: Hr. _____ Min. _____

Otah's father had no scientific information about fire. He had learned, however, how to make a fire by rubbing two dry sticks together. That is how he lighted the torches before the men went into the mine.

Since that time scientists have learned a great deal about fire. In this article you will read some of the things that they have found out.

WHAT MAKES FIRE BURN?

First: You must have a substance that is able to combine with the oxygen in air. Paper, wood, coal, sugar, and cotton can combine with oxygen, so it is possible for all of these to burn.

Second: The substance must be heated to the *kindling temperature*. This is the lowest temperature at which it begins to burn.

Third: There must be plenty of oxygen at the place where the substance is kindled. Even lighted paper will stop burning at once if it is taken out of the air and put where it cannot get oxygen.

HOW TO PUT OUT A FIRE

You can put out a fire by removing any one of the three things above.

* Based upon material prepared by Maurice U. Ames.

Removing the substance that burns will put out a fire. A forest fire can be stopped if it comes to a ditch from which everything that will burn has been removed, because there is nothing left to catch fire.

If you throw something over the fire that has a higher kindling temperature than the substance that is burning, it will put out the fire. Water thrown on a wood fire will put the fire out, because wet wood has a higher kindling temperature than dry wood.

The best way of putting out many fires is to shut off the supply of oxygen which they are drawing from the air. This can be done by throwing a rug, some sand, or an asbestos blanket over the fire. Carbon tetrachloride vapor and carbon dioxide gas will put out fire also, because they shut out oxygen. The fire, of course, cannot burn in carbon dioxide gas or vapor.

HOW DO FIRE EXTINGUISHERS WORK?

In one type of fire extinguisher, sulfuric acid is mixed with a solution of bicarbonate of soda. This produces carbon dioxide gas. This mixture works very well because the water in the solution makes the kindling temperature higher. And the carbon dioxide forms a blanket of vapor that shuts out the air.

Firefoam extinguishers are used to put out fire

caused by oil that is burning. These extinguishers contain a foamy mixture of carbon dioxide gas and licorice extract which is sprayed on the fire. This mixture puts out the fire because it floats on the oil and

shuts out the air. Without air the fire dies out.

Small hand-pump extinguishers contain liquid carbon tetrachloride. When sprayed on fires this puts them out by forming a vapor blanket to shut out air.

	<i>Hr.</i>	<i>Min.</i>	<i>Sec.</i>	
Ending time:	_____	_____	_____	No. words $\frac{476}{\text{No. seconds}} \times 60 = \text{_____WPM}$
Beginning time:	_____	_____	_____	

Did you read this article faster than you read the last *science* article on pages 104–105?

Write your speed for doing each kind of timed reading in this unit.

1. *story* _____ 2. *social studies* _____ 3. *science* _____

How do these speeds compare?

No. 1 should be the fastest speed; No. 2, next in order; and No. 3, the slowest. Although you should never try to reach the same speed in reading all of these subjects, you can learn to read faster in all of them. Keep on practicing. Try always to take in longer groups of words at each glance. Force yourself to read rapidly, but never read so fast that you do not get the meaning of the story or article.

ACTIVITY 1—HOW? WHAT? WHY?

Fill in the blank spaces:

1. How did Otah's father make a fire? _____

2. Three things are necessary to make fire burn. What are they?
 a. _____
 b. _____
 c. _____
3. There are three ways of putting out a fire.
 a. Removing the substance that burns will put out a fire
 because _____

- b. Water thrown on burning wood will put out a fire
 because _____
- c. Throwing a rug or carbon dioxide gas over a fire will
 put it out because _____

4. The contents of fire extinguishers work in different ways.
 a. One type produces carbon dioxide from sulphuric acid and a solution of bicarbonate of soda. This mixture puts out fires because _____

- b. Another type of extinguisher contains a foamy mixture of carbon dioxide and licorice extract. This mixture is good for putting out fires on oil because _____

- c. A third type of extinguisher is the small hand-pump extinguisher which contains liquid carbon tetrachloride. This liquid puts out fires because _____

You may allow a score of 10 for the correct answer to each of the items marked *a*, *b*, or *c* as well as for the answer to question No. 1.

Comprehension score: _____ Speed: _____WPM

ACTIVITY 2—READING DIRECTIONS FOR AN EXPERIMENT

Read the directions for the experiment on the left side of the page with great care. Then cover them with a paper, and see if you can write the experiment on the right side of the page *exactly* as you would carry it out. Add what you think your conclusion might be at the end of the experiment.

Finding Out If Carbon Dioxide Puts Out Fire

- Put three heaping teaspoons of baking soda into a gallon jar.
- Place water about one inch deep in the jar.
- Add $\frac{1}{4}$ cup of vinegar.
- What happens? The gas which arises is carbon dioxide.
- Put a string on a lighted candle and lower it into the jar.
- What happens? Why?

READING AND THINKING IN MATHEMATICS

ACTIVITY 1—MAKING A TIME LINE IN MATHEMATICS *

See how well you can follow directions in making a mathematics time line to represent the different ages of man. The line itself has been drawn for you. Read the directions *very* carefully and do exactly what they tell you to do.

Write B.C. at the left-end of the line to represent *Before Christ*.

Write A.D. at the right end of the line to represent *After Christ*.

Allowing $\frac{1}{2}$ inch for 1,000 years, measure back to the left from zero and make a short vertical mark on the line to show where 1000 B.C. would begin. Print *Iron Age* above this mark in a vertical arrangement, and print *1000 B.C.* vertically below the line.

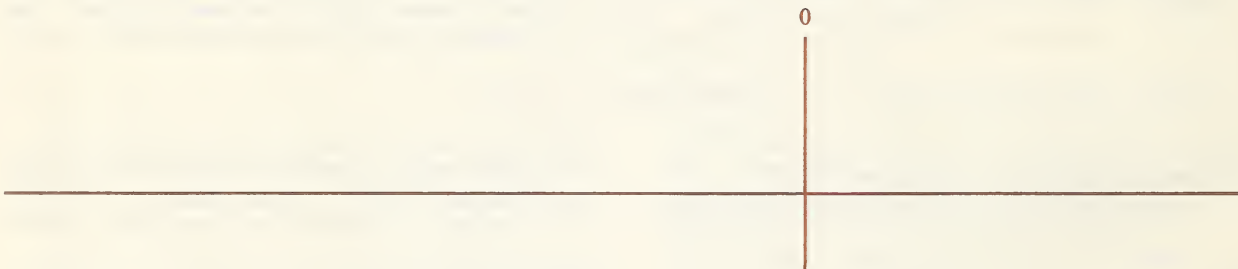
Using $\frac{1}{2}$ inch to represent 1,000 years, show in the same way where 3000 B.C. would fall on the line. Print *Age of Bronze* above this mark in a vertical arrangement. Put the date below, in a vertical position.

Using $\frac{1}{2}$ inch to represent 1,000 years, mark off 6000 B.C. Print *New Stone Age* above this mark in a vertical arrangement, and put the date vertically below.

Using $\frac{1}{2}$ inch to represent 1,000 years, mark 1000 A.D. on your time line, vertically below the line.

Using the same unit of measure, mark 2000 A.D. on the line, vertically below the line.

Place a tiny cross at the point at which you think your life fits into the time line.



1. In the years before Christ, did the periods of progress become shorter or longer? _____
2. Compare the length of the New Stone Age with the length of the period extending from the Bronze Age to the zero line. How do they compare? Is one longer

- than the other? _____ Equal? _____
3. Expressed in a fraction: The period extending from the beginning of the Iron Age to zero is what part of the entire period extending from the beginning of the Bronze Age to zero? _____

ACTIVITY 2—READING PROBLEMS

Do each step mentally before working these problems. Use separate paper for figuring.

1. Some people think that human beings wandered about in the Old World 500,000 years ago. Human beings began to live in the New World 10,000 years ago. About how many years is this after humans first lived on earth?

Answer: _____

* Based upon material prepared by Donald W. Lentz.

2. One of the largest salt mines has 65 miles of tunnels. How many hours would it take to walk this distance at the average rate of 2.5 miles per hour?

Answer: _____

3. The shaft of a certain salt mine is 1,300 feet deep. The Sun Life building in Montreal is 387 feet high. How much greater is the depth of the salt mine than the height of the building?

Answer: _____

CHOOSING THE RIGHT DEFINITION

When you look up a word in the dictionary you often find that the word has several meanings. You need to read all of these meanings and pick out the one that best fits into the context of the sentence you are reading.

In each part of the page below, you will find several meanings of a word, and each meaning is numbered. You will also find some sentences, each containing an italicized word. Find the right meaning for the italicized word in each sentence, and write the number of this meaning on the line at the end of the sentence.

The first one has been done for you.

A. block: (1) a piece of wood, stone, or the like, solid and more or less bulky; (2) a mold or form upon which articles are shaped; (3) a quantity, number, or section of things dealt with as a unit; (4) a stoppage or hindrance; (5) a stupid, dull, or unfeeling person.

a. Mr. Steele bought a whole *block* of seats for the show. _____

b. Sometimes entire *blocks* of salt are cut from a salt mine. _____

c. Mr. Holmes didn't leave his hat at the Like-New Hat Shop because the owner didn't have the right *block* for shaping it. _____

B. border: (1) the outer part or edge of anything; (2) a strip near, around, or at the edge of something, usually ornamental; (3) a boundary of a state or settled country; (4) a plait or braid of hair about the forehead; (5) a long narrow bed used for continuous planting.

a. Mr. Wood had a *border* of flowering shrubs around his yard. _____

b. Mr. Cooke had to show his passport before he could cross the French *border*. _____

c. The handkerchief had a bright red *border*. _____

C. character: (1) a sign, mark, or symbol; (2) moral vigor or firmness; the traits of honesty, truthfulness, industry, and so forth; (3) one of the persons in a story, play, or novel; (4) an odd or eccentric person.

a. Otah was the chief *character* in the salt mine story which you read. _____

b. Harold was honest, truthful, and industrious.

He had a fine *character*. _____

c. W. L. MacKenzie was quite a *character*. _____

D. plot: (1) a small area of land; (2) a ground plan, as of a building; a map, chart, or diagram; (3) any secret scheme or plan, usually evil; (4) the plan or main story in a novel, play, or poem.

a. A fruit farmer planted thirty trees in a small *plot*. _____

b. The men flew over the desert and made a *plot* of the land it contained. _____

c. The story had an interesting *plot*. _____

E. organ: (1) a musical instrument; (2) a part in an animal or plant adapted to the performance of a specific function, as the heart, kidney, and so forth; (3) an instrument or medium by which an important action is performed or end accomplished; courts, tax-gatherers, and so forth are organs of government; (4) a medium of communication, as a newspaper or magazine.

a. The heart is a very important *organ*. _____

b. Jane was taking music lessons on the new *organ* her father had bought for her. _____

c. The House of Commons is an *organ* of government. _____

F. mine: (1) a pit in the earth from which ores, precious stones, coal, or other minerals are taken; (2) any place where ores, metals, or precious stones are obtained by digging or washing; (3) an unmined deposit of a mineral or ore; (4) a rich source; an abundant store; (5) an explosive charge contained in a case and placed in the water to destroy or impede enemy vessels; (6) a bomb used in war.

a. Mr. Jones had a *mine* of fine, old books. _____

b. Ships could not sail through the channel until the *mines* had been cleared away. _____

c. Copper is dug from deep *mines* near Sudbury. _____

There are some people who believe *everything* they read. They think that anything stated in print must be true or it wouldn't have been printed.

We must remember that many articles or books represent just one man's or woman's opinion. In such cases you have a right to question the opinion of the writer and to do your own thinking about the subject.

Of course there are many articles and books which we would hesitate to question. We would be apt to accept statements made by an expert in his field; statements in an article in which the facts are "backed up" with figures, graphs, and charts; articles describing what a traveller saw in traveling through a foreign country, and so on. But when a writer simply gives his opinion on some subject, you should think carefully about his statements before you accept them as truths. Do your own thinking and agree or disagree as you see fit. If you don't know much about the subject, however, you should delay drawing definite conclusions until you have looked up more information.

In the article below, the writer describes some money-making tricks. He also expresses his opinion, or the opinion of the one who used a trick, on the reason why the trick worked.

Carefully read the article below. Think about the writer's statements as you read. Question some of them if you like. Disagree with the writer on some of his statements if you think that he is wrong. In other words *read critically*.

Tricks That Ring Cash Registers *

It happened to me years ago in Penfield. As a small boy, I earned spending money by selling eggs on my Grandpa's farm on Sunday afternoon.

Grandpa had a real fancy sign made for me. It was painted in three bright colors. It read FRESH EGGS. It had a fancy white pullet in the upper left-hand corner.

Then one day the rain and wind shattered my sign. So I made myself a crude, homemade sign and propped it on an old apple box.

Being a small boy I had put the S's on backward. My business doubled that day.

I had unearthed my first "trick of the trade" in life. The city folks, seeing my homemade sign, figured I was just a country boy who didn't know about city prices.

I learned early in life that selling things to people is a "trick," but it is *not* "trickery."

Trickery can only be used once per person; tricks of the trade can be repeated day in and day out, because they are lawful.

Since the Penfield days I have been collecting tricks of the trade. Soon business houses were writing to me for "some of your selling sizzles." I opened up shop.

My first customer was American Airlines. Working with these people in developing this new trade, we quickly decided to leave out "safety belts" and "thunder storms."

The stewardess used to rush up and shout, "Better hook up your safety belt for the thunderstorms ahead!"

You gulped fast. Sweat poured from you. At the next airport you cancelled out, taking a train.

Now the stewardess says, "May I fasten your *seat* belt for the *climatic changes* of nature ahead?"

You fasten yourself in, and relax as you watch the climatic changes of nature.

Some seventeen years ago people in a famous drug-store chain used a trick of the trade to get an egg into their milk shakes as a plus sale. Business was scarce those days. Everybody needed plus business.

In the beginning the soda clerk would say: "Will one egg be enough?" nodding his head.

Most customers nodded back (monkey-see, monkey-do trick), and got the egg. Then got outside, and scolded themselves for having been taken in.

So "One or two eggs in your shake?" was tried, with the clerk holding an egg in each hand, in full view of the customer.

The average customer (and that is all of us) would look first at one egg, then the other, and say, "Oh, one egg is enough."

In actual tests, six out of ten customers replied this way.

Another drugstore chain in New York and a department store fountain in Brooklyn used a similar plan to sell large-size drinks. The clerks said, "Large one?" nodding their heads.

We tested the idea on 5,000 customers and sold large drinks to 3,600 people.

* Adapted from Elmer Wheeler, "Tricks That Ring Cash Registers," *Money Making Ideas*, Farrel Publishing Company, N. Y., 1950, pp. 74-76. (Condensed from *Nation's Business*. Copyright, The Chamber of Commerce of the United States, Washington, D. C.)

That meant five cents more per customer. This increase in business saved many a small drug store during an entire period of tough years.

The power of words!

Take the small firm that had difficulty in telling people its location until it used ads saying:

ACROSS THE STREET FROM MARSHALL FIELD'S

The subways that changed the weighing machines to read INSERT COIN instead of the usual INSERT PENNY. They now get a few nickels and dimes.

The boy at the ball park with the vending tray, who couldn't get through the crowd shouting, "Step aside, please!" Suddenly he shouted, "Watch out for the mustard!" and people quickly pushed aside to let him by with his tray of—peanuts!

The salesman who says, "Just put your okay here, lady," or, "Just spell your name out for our bookkeeping department." You see, people don't like to write their names when the clerk says, "Sign here."

Tricks of the trade! You find them everywhere!

The shoe clerk who removes your shoe quickly, and places it ten paces away so you can't suddenly leave the store while he is in back looking for your size.

The cafeteria that puts desserts first in the line, before you have loaded up your tray with meat and potatoes. Desserts are long-profit items.

You will find trickery and tricks side by side; you must learn to know the difference. Find trickery and you are through; but find tricks of the trade and you are in for business success.

Take, for example, those shops that sell linens and handkerchiefs. Even on Fifth Avenue in New York City they are barren-looking, with their usual signs, "Going Out of Business," or "Forced to Sell," or the classic "Last Day" in the front window.

I noticed their price tags. All on cheap cardboard, or even paper bags, and right on Fifth Avenue, no less. Where was the trick of the trade?

I stepped into one of the stores. I asked the pleasant Arabian salesman. His answer was as simple as mine was when I lost my fancy sign in the three weatherproof colors, with the white pullet.

He said humbly, "People read these cardboard signs and think we are stupid foreigners. They come in to take advantage of us. Fancy signs would scare them away!"

Oh, hum, nothing has changed since Penfield!

QUESTIONING STATEMENTS

1. What reason did the writer give for the fact that his egg business doubled after he made his sign?

Do you think that was the real reason? _____

What other reason might it have been? _____

2. Do you think the fact that tricks are allowed by law is a good reason to use them? _____ Why?

3. Do you think the changed wording which the writer suggested for the stewardess to use would cause you to relax? _____ Why? _____

4. Suppose you had bought a milkshake in the drug-store described. Do you think you would have

taken an egg in it because of one of the tricks the clerk used? _____ Why? _____

5. Might you accept one of these two tricks as being more fair than the other: (a) the shoe clerk's trick, (b) the Insert Coin sign? _____ Why? _____

6. Do you think the salesman's reasons for using crude signs was sound? _____ Why? _____

7. Can you think of a trick which at some time caused you to buy something? _____ What was it?

8. When you read an article in the future in which the writer gives a personal opinion, what will you do? _____

9. If you don't know much about the subject, what will you do before passing final judgment on some of the statements? _____

CHANGING MEANINGS BY ADDING PREFIXES

Below are some sentences with missing words. You are to write the missing word in each blank space.

Choose a word for each space from the list of root words below. The ending ed has been added to some of the root words because they are to be fitted into sentences in which they are used in the past tense.

Add to each root word one of the prefixes chosen from the list of prefixes below. The prefix must be chosen to make the root word have the right meaning as used in the particular sentence in which you plan to write the word.

un mis trans out over under

bark	wit	current	directed
fed	cooked	brush	common
clouded	doors	time	lighted
fortune	able	put	planted
formed	laid	rule	ground
step	greedy	view	clothes

1. Otah would probably have fallen if he had made a _____ while walking over the rough floor of the mine.
2. The torches were _____ until the Indians were ready to crawl through the hole into the cave.
3. Even with the torches, the mine was _____ while the men worked.
4. On the day the men went to the salt mine the sky was _____.
5. When Otah's father left for a long trip the others wished him well and hoped no _____ would befall him.
6. The Indian's _____ of salt was so great that they had some to trade.
7. Primitive people were _____ to travel great distances because they had no trains, airplanes, or ships.
8. Primitive people ate a great deal of their food _____.
9. Early primitive people spent most of their time _____.
10. The chief of a tribe could _____ all others in the tribe.
11. Mr. McIntosh often had to clear away _____ before he replanted the trees.
12. The horse was very thin and bony because he had been _____.
13. Many plants in the desert will not live when _____ to other parts of the country.
14. The stream had a deep _____.
15. The soldiers made their way into the city through an _____ passage.
16. It seemed that Jim's little poodle tried to _____ Tom's big bulldog.
17. Hal went to the top of the mountain where he could get a good _____ of the country.
18. Tom's letter never reached the person to whom he wrote, because it was _____.
19. Jack's father was late getting home last night. He worked _____.
20. Edward couldn't find his science book. He had _____ it.
21. In many of the old fables, one animal tries to _____ another.
22. The old man was very, very greedy. People who knew him said that he was _____.
23. The caterpillar was _____ into a butterfly.
24. Thunderstorms are _____ in winter.

CHANGING MEANINGS BY ADDING SUFFIXES

Below are some sentences with missing words. You are to write the missing word in each blank space. Choose a word for each space from the list of root words below. Add to the root word one of the suffixes chosen from the list of suffixes. Sometimes you will need to drop a final e, o, or y when you add a suffix. Sometimes you will need to add an s to the new word.

Be sure that you choose a word and add a suffix which will give the right meaning as used in the particular sentence in which you plan to write the word.

ful ment er ist en less ness ly

meat	real	rapid	colony
event	govern	art	sweet
settle	help	life	high
shape	wood	arrange	point
fire	bag	mine	eat
	piano	kind	

1. Drawings and paintings on the walls of caves show that some of the people were _____ even in the Old Stone Age.
2. Village life during the New Stone Age led to the beginning of _____.
3. One day an early man hammered something out of bronze, but no one could tell what it was. It was quite _____.
4. The men who went to the salt mine were salt _____.
5. The mescal plant has a certain _____ which Otah could taste.
6. Every man had at least one _____ of salt.
7. Some people eat only vegetables. Their meals are _____.
8. Alan McIntosh was good to his neighbours. He showed _____ to all.
9. In time the early _____ of the pioneers became towns and cities.
10. William Lyon Mackenzie lived in Colonial days. He was a _____.
11. The pioneer's wife stirred food in a large pot with a _____ spoon.
12. Mr. McIntosh told his son that a _____ is a man who faces facts.
13. The deer had been shot through the heart. It was quite _____.
14. Many things have happened during the last few years. This period has been _____.
15. Wet wood has a _____ kindling temperature than dry wood.
16. No one could answer the man's question. It seemed _____.
17. Marjorie could play the piano very well. She was an excellent _____.
18. Sarah was not hungry. She had _____ dinner before she left.
19. Some of the barren lands through which the pioneers passed were _____.
20. The _____ of words in the list above makes it easy for you to find the one you want.
21. The activities which you have carried on in this book should be _____ to you in studying your textbooks.
22. You should read more _____ now than you did when you were beginning this book.
23. The caves of primitive men must often have been cold, for these men were _____.

WORKING WITH WORDS OF MULTIPLE MEANINGS

Some words have different meanings when used in different subject fields. You will find words of this type in the list below.

scale	settlement	plot
plant	force	column
bar	mouth	basin
cone	current	stage
deposit	stock	figure

Read the first definition. Choose a word from the list that goes with that definition. Do the rest of the page in the same way.

- | | |
|--|---|
| <p>1. _____ In <i>geography</i>: the outlet of a river.</p> <p>2. _____ In <i>science</i>: a part of the face.</p> <p>3. _____ In <i>social studies</i>: cattle kept on farms or ranches.</p> <p>4. _____ In <i>arithmetic</i>: a share of capital used in business, trading, or investing.</p> <p>5. _____ In <i>geography</i>: the swift part of a moving stream.</p> <p>6. _____ In <i>history</i>: having to do with the present time.</p> <p>7. _____ In <i>science</i>: a hard, flattened plate forming part of the outer covering of an animal.</p> <p>8. _____ In <i>arithmetic</i>: a machine for weighing, or anything marked by lines at regular intervals.</p> <p>9. _____ In <i>social studies</i>: the army or armies that a country has to fight with in war.</p> <p>10. _____ In <i>science</i>: energy or active power that produces some effect.</p> <p>11. _____ In <i>geography</i>: the land drained by a river and all of its branches.</p> <p>12. _____ In <i>social studies</i>: a round, shallow dish or vessel used for kitchen purposes.</p> <p>13. _____ In <i>English</i>: a platform where players act out a play.</p> <p>14. _____ In <i>science</i>: one of several periods of growth.</p> <p>15. _____ In <i>social studies</i>: a place where manufacturing is carried on.</p> <p>16. _____ In <i>science</i>: something that grows from seeds, spores, roots, or slips.</p> | <p>17. _____ In <i>literature</i>: the plan, or line, or design of a story, play, or novel.</p> <p>18. _____ In <i>arithmetic</i>: a piece of land or of some other flat surface.</p> <p>19. _____ In <i>art</i>: an object having shape and form.</p> <p>20. _____ In <i>arithmetic</i>: a number.</p> <p>21. _____ In <i>science</i>: a natural pile up, coating, or accumulation of soil or minerals.</p> <p>22. _____ In <i>arithmetic</i>: a sum of money put in the bank and paid as the first payment on something.</p> <p>23. _____ In <i>geography</i>: a bank of sand or gravel that prevents ships from sailing into a river or harbor.</p> <p>24. _____ In <i>music</i>: a vertical line across the staff.</p> <p>25. _____ In <i>arithmetic</i>: a broad line, usually longer than it is wide, used in making a certain kind of graph.</p> <p>26. _____ In <i>science</i>: the seed-bearing part of pine trees.</p> <p>27. _____ In <i>geometry</i>: a solid figure shaped something like an Indian teepee.</p> <p>28. _____ In <i>art</i>: a pillar or post used in buildings.</p> <p>29. _____ In <i>arithmetic</i>: a perpendicular row of figures.</p> <p>30. _____ In <i>social studies</i>: a new place where groups of families move to live.</p> <p>31. _____ In <i>arithmetic</i>: the payment of a bill.</p> |
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Returned DEC 8 '77			
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